1961 WORLD PETROLEUM REPORT

TEN DOLLARS PER COPY

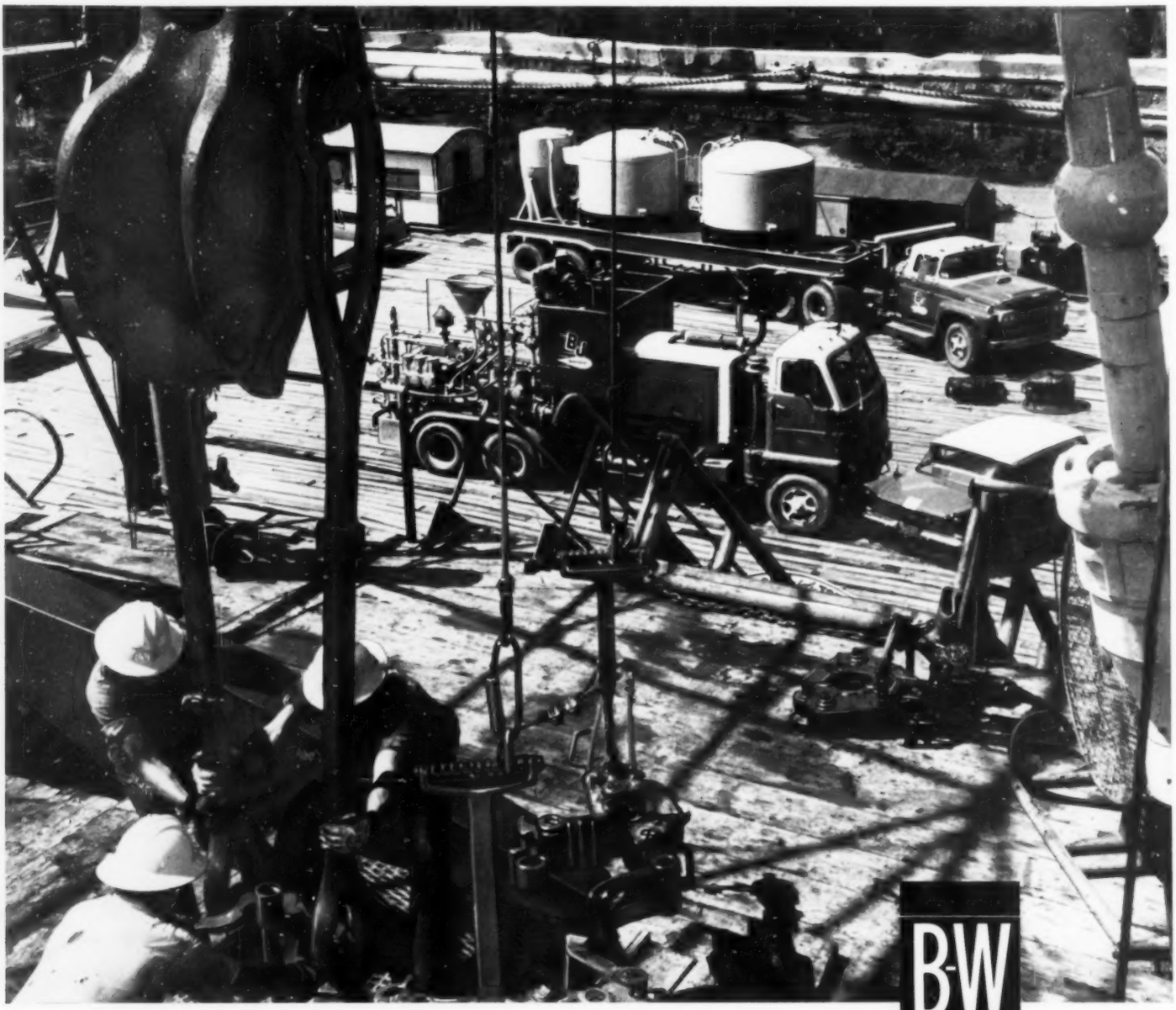
TABLE OF CONTENTS PAGE 17

The 7 Hats of Borg-Warner . . . (top) national defense; oil, steel and chemicals; (middle row) agriculture; industrial machinery; aviation; (bottom) automotive industry; home equipment.

From under the 7 Hats of Borg-Warner. . .

Men, minds and machinery to serve the petroleum industry from drilling rig to refinery!

Crews of BJ Service, Inc., keeping wells healthfully productive through cementing and treating techniques. Engineers of the Roy C. Ingersoll Research Center, helping to develop power tools that probe deeper and deeper below the earth's surface. Pumps of the Byron Jackson Division, handling hot oil at 800° refinery temperatures and pushing oil products through pipeline "arteries." These men, minds and machinery are among the many reasons why it can be said—Borg-Warner Corporation contributes essentially to every phase of the petroleum industry.



OIL TOOLS BY BORG-WARNER'S BYRON JACKSON DIVISION — at work in every oil field from the Middle East to our West Coast — include hooks, links, elevators, tongs and power tools to handle drilling pipe reaching as much as five miles into the earth and weighing up to one million pounds. Called "Red Iron" by oil crews, these BJ tools are part of the basic equipment on almost every drilling rig. In the background are cementing trucks, including a high-pressure pumping truck and special bulk cement unit — members of the familiar blue-and-yellow fleet of BJ Service that provides technical field services.

B-W

BORG-WARNER

BETTER PRODUCTS THROUGH
CREATIVE RESEARCH AND ENGINEERING

200 South Michigan Avenue • Chicago 4, Illinois

PRETTY CRUDE

There've been a lot of wells drilled that wouldn't even produce one jar of crude . . . maybe half the ocean, but not oil. On the other hand, when you do get a producer, that oil is really pretty!

When you want to determine what the well will produce, the surest way to find out is to drill stem test with Johnston test tools. Cost? A string of Johnston test tools can actually save you thousands of dollars in casing costs! And the tools are fast, accurate and tough!

One example is the Johnston packers which have breezed through hydrostatic pressures up to 23,000 psi and over 400° temperature with no trouble.

Think about it! Then write us.

Please send me descriptive literature and a Johnston catalog on the newest Drill Stem Test tools.

NAME

TITLE

COMPANY

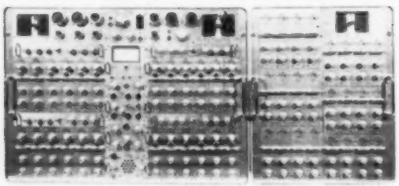
ADDRESS

JOHNSTON TESTERS

P. O. Box 98. Houston 1, Texas. U.S.A.

from DRESSER ELECTRONICS SIE DIVISION these new TO SAVE YOUR

EXPLORATION

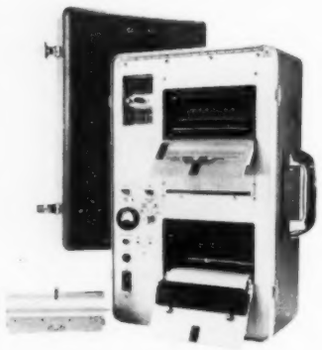


PT-100 TRANSISTORIZED SEISMIC AMPLIFIER with radically improved signal-handling capabilities to eliminate distortion

The PT-100 combines obvious transistor design advantages — low power drain, light weight, compact size — with performance improvements allowed only by solid state components. It is a significantly new seismic amplifier.

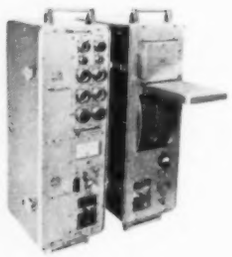
Use of a light-sensitive photocell as an AGC element provides signal control never before possible. This amplifier will not overload in any area. Transistor circuits eliminate maintenance problems such as are inherent with vacuum tube designs. Low-cut filters in the geophone line help insure negligible overall distortion. Operator-oriented master controls provide separate record and playback adjustments for both "early" and "final" amplifier gain.

Significantly improved results are now possible in refraction, reflection and high frequency recording with the all new PT-100.



TRO-6 TRIPLE RECORDING OSCILLOGRAPH provides multiple display but needs only one galvo block

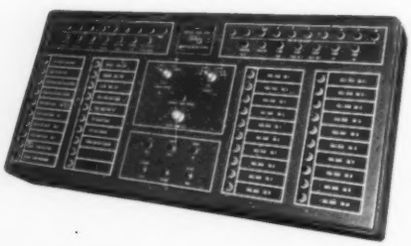
From SIE comes the first multiple display oscillograph requiring only one galvo block. Choose variable density, variable area, conventional wiggle, variable-density-and-wiggle superimposed, or variable-area-and-wiggle superimposed. Timing lines may be from flasher tubes or timing motor. Flashers, driven from self-contained circuitry, can be controlled by an internal fork or from a tape playback signal. Record speed is accurate and repeatable with "locked-in" drive. A synchronous motor — completely free from "camera hash" — is driven from a built-in transistorized amplifier with a 400 cps drift-free, non-position-sensitive fork. Answer all your oscillograph recording needs with this one camera.



PMR-20 PORTABLE FM MAGNETIC RECORDING SYSTEM for high-fidelity field records.

Two compact units contain a complete 24 trace high-fidelity FM magnetic recording system, the PMR-20. The MR-20 Transport Unit houses the recording drum, drive system and recording heads. The MU-20 Master Unit contains the modulators, demodulators and auxiliary electronics. Each unit has its own built-in transistorized power supply. PMR-20 FM recording provides an improved signal-to-noise ratio and lower distortion as compared to other recording systems. A frequency response of from 1 to 500 cps coupled with frequency-modulation recording provides true high fidelity performance. Join the many users of more than 50 PMR-20 systems already in the field.

LEASE AUTOMATION



SIEMARC DISPATCH CONSOLE IN PHILLIPS VENEZUELA SYSTEM designed to permit unattended operation of offshore platform.

Automatic, one-man control of a twenty-well lease from this single console seventy miles away is possible by dependable, solid-state SIE equipment. Scanning, display and logging of alarms and data is included with shutdown control for wellhead and processing equipment. Modular construction of components and sub-assemblies allows system flexibility at minimum cost. All control, alarm and data signals are handled in error-safe digital code. Complete fail-safe design and continuous monitoring assure installation safety.

products
TIME AND MONEY

PIPELINE CONTROL

DISPATCHERS CONSOLE used by Cherokee Pipe Line Company for automatic control of liquid line.

SIEMARC Supervisory Systems provide automatic monitoring and remote control for many industrial operations and processes including the petroleum installation pictured. Measuring, data gathering, telemetering, logging, display, indicating and computing are all integrated in the system. Both solid-state and relay components are used as dictated by proper engineering design. Transistors and semiconductor diodes are utilized in all high-speed switching and logic circuits including encoders, decoders, analog-to-digital converters, deviation detectors and magnetic drum circuitry. Separate electric logging typewriters record data and alarms.

POWER LEVEL CONTROLLER used by Shell Pipe Line Co. for maximum pumping station operating economy.

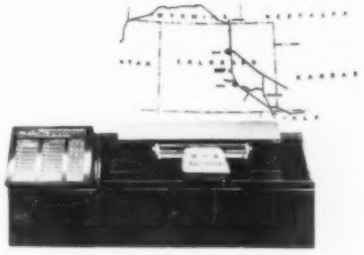
Completely unattended operation of a multi-unit pumping station is possible with a Power Level Controller now in use by Shell Pipe Line Co. The unit accepts signals from flow and pressure pickups and makes logic decisions to bring proper combinations of pump units on or off stream automatically. It may be connected to the supervisory control system to permit reset of power levels from a central office dispatching console.

COMPRESSOR STATION CONTROL CONSOLE including complete engine control equipment for automatic station operation and safety.

For gas transmission automation, the basic SIEMARC system can be coupled with Log-Alarm Shutdown and Engine Control-Sequence units. Building block design throughout allows SIE to fit your needs exactly.

DISPATCH PANEL used by Colorado Interstate Gas Company.

In the Colorado Interstate Gas Company installation shown, dispatchers transmit only desired discharge pressure settings; automation at each compressor station responds by maintaining the selected value for optimum station economy. If communication links fail, local automation operates without interruption. Log-Alarm units insure station safety. Dispatchers are alerted only when trouble occurs.



The equipment shown here—and all the rest from SIE—illustrates the company's fundamental design concept: electronic systems and products to provide you with fastest payout and lowest overall operating expenses.

Accelerate your present cost reduction program by writing:

DAY	NIGHT	SERVICE
Call: SUnset 2-2083 Houston		

DRESSER ELECTRONICS

SIE DIVISION / ONE OF THE DRESSER INDUSTRIES

10201 Westheimer, Houston 42, Texas

INDUSTRY-WIDE USE

BUILT ON OUTSTANDING PERFORMANCE

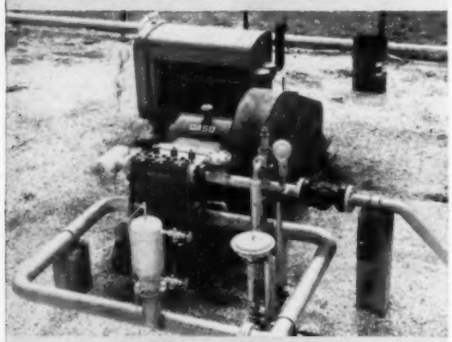
Not too long ago Gaso Pumps were known principally for their work in pipe line service.

Today they are specified in ever increasing volume by all branches of the industry.

The reason is obvious: Engineers concerned with water flooding, salt water disposal, oil well cementing, oil well acidizing and fracturing, LPG underground storage, mine water disposal and other operations involving pumps are just as interested as pipe line engineers in the extra years of trouble-free service which have become a Gaso trademark.

Performance speaks a universal language, and it's performance upon which Gaso leadership is built.

GASO PUMPS IN PIPELINE SERVICE



GASO PUMPS
FOR SALT WATER DISPOSAL

GASO PUMPS IN LPG SERVICE

GASO PUMPS
for every oil industry need

SEND FOR OUR
1960 - 1961
CATALOG

DISTRIBUTORS:

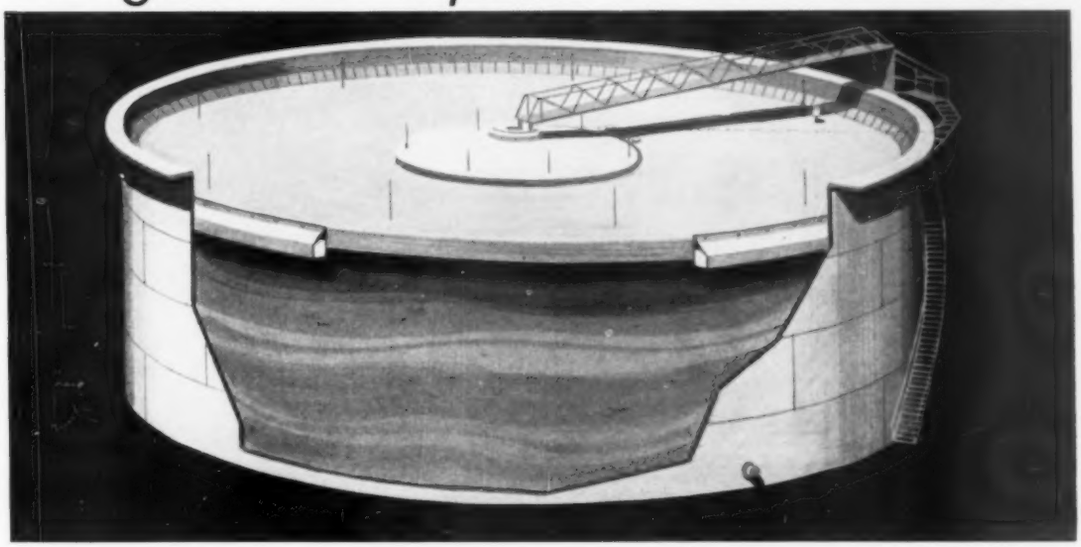
Farmington, N. M. – Gaso Pump & Burner Mfg. Co.
Shreveport, La., Odessa, Texas, Brookhaven and Tinsley, Miss. – W. L. Somner Company
Houston, Texas – Texas Pump & Compressor Company
Wichita Falls, Texas – Pump Engineering Co.
Evansville, Ind. – Hague Equipment Co., Inc.
Long Beach and Bakersfield, Cal. – Power Pumps, Inc.
Casper, Wyoming – Lufkin Foundry & Machine Co.
Edmonton, Alberta – Lufkin Machine Co., Ltd.

PUMPS FOR:

CRUDE OIL GATHERING LINES • CRUDE OIL PIPE LINES • PETROLEUM PRODUCTS PIPE LINES • GASOLINE PLANTS-ABSORPTION OIL • LPG UNDERGROUND STORAGE • WATER FLOODING • OIL WELL CEMENTING • OIL WELL ACIDIZING AND FRACTURING • SMALL VACUUM SYSTEMS

GASO PUMP & BURNER MFG. CO. First and Lansing Streets, Tulsa Oklahoma • Export Office: Empire State Building, New York, N. Y.

No gas! No liquid! A SOLID seal!



nothing can disable

EverSeal*

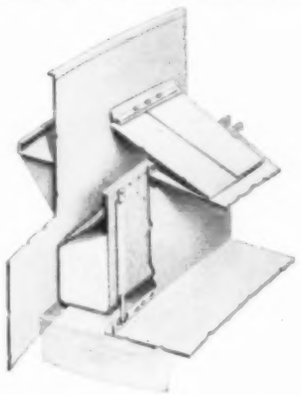
General American's new cushion seal for floating roofs

Tear it! Gouge it! Puncture it! The seal will hold. No matter what the damage, it will not burst or rupture! There's nothing in EverSeal to spill or leak.

Urethane cushions firmly joined and enclosed in a vapor-tight, no-scuff envelope of BUNA "N" and PVC are protected by the General American weather hood.

EverSeal resists the abrasive action of rough tank walls, yet will not scratch or damage tank coatings.

Get the complete details about EverSeal! Write the General American licensee nearest you. For any type of conservation structure, *it pays to plan with General American.*



WHY THE NEW GENERAL AMERICAN EverSeal IS FAR BETTER THAN ANY TUBE TYPE SEAL

1. No liquid or gas to leak
2. Replace entire seal or a section without taking roof out of service
3. EverSeal will accommodate a 10" variation in annular space between roof and shell
4. No moving parts—nothing to corrode
5. Costs less than most other seals
6. Permits full travel of roof, yet rides easily over projections on shell and maintains seal
7. Protected from sun, rain, snow and dirt by the General American weather hood
8. Eliminates buildup of vapors in seal area
9. Will not freeze to sides of tank
10. Provides full protection for oxygen-sensitive stocks

**Patent Rights Reserved*

Overseas Division

GENERAL AMERICAN TRANSPORTATION CORPORATION

380 Madison Avenue • New York 17, New York

For further information communicate with your nearest licensees:

Ashmore, Benson, Pease & Co. Africa (Pty.) Ltd.
P. O. Box 8608
Johannesburg, South Africa

Societa per Azioni Forni ed Impianti Industriali Ingg. de Bartolomeis
Via Settembrini, 7
Milan, Italy

Etablts. Delattre et Frouard Reúnis
Rue de la Bienfaisance, 39
Paris 8, France

A. E. Goodwin Ltd.
315 Parramatta Road, Auburn
Sydney, N. S. W., Australia

Redheugh Iron & Steel Co. Ltd.
Teams, Gateshead,
Durham, England

Sanson Vasconcellos Comercio e Industria de Ferro, S. A.
Avenida Rio Branco 81-13° Andar
Rio de Janeiro, Brazil

Carl Spaeter, G.m.b.H.
Postfach 3928
Saarlandstrasse 2-30
Hamburg 33, West Germany

Taiwan Machinery Manufacturing Corporation
25 Kung Yuen Road II
P. O. Box 30
Kaohsiung, Taiwan (Formosa)

T. I. W. Western Ltd.
97th Street and 126 Avenue
Edmonton, Alberta, Canada

The Toronto Iron Works, Ltd.
629 Eastern Avenue
Toronto, Ontario, Canada

Tsukishima Kikai Co., Ltd.
9, 5-chome, Tsukishima-dori
Chuo-ku, Tokyo, Japan

Vereinigte Osterreichische Eisen- und Stahlwerke A. G.
VOEST
Postfach Nr. 2
Muldenstrasse Nr. 5
Linz-Donau, Austria

THE FACTS ABOUT DUAL COMPLETIONS

Yours for the asking is Baker Bulletin 374, pictured above. It's a 52-page booklet designed to give you a perspective on dual-string completions. It tells you how to evaluate a dual packer. Step-by-step, schematics show how to make Baker dual-string hookups. Write to Baker Oil Tools, Inc., P.O. Box 2274, Terminal Annex, Los Angeles 54, Calif.

*9 Modern Production Packers

These are

Packer Accessories? Baker offers a complete line that makes the packers more usable and adaptable. Dual and triple string flow tubes, for instance, and plugs and other accessories.

BAKER MODEL "D" RETAINER PRODUCTION PACKER

Product No. 415-D

The most widely used drillable packer in the world. Contains continuous sealing bore and flapper-type back-pressure valve.

BAKER MODEL "DA" RETAINER PRODUCTION PACKER

Product No. 415-DA

Direct variation of Model "D" with a larger I.D. sealing bore, located in the upper end of the packer. Permits larger bore through packer accessories. Used as an upper packer in two-packer flowing or pumping, parallel string hookups.

Single-Zone? Multiple-Zone? Water-Flooding? Deep Wells? Shallow? High Temperatures? Formidable Pressures? ■ The nine packers pictured here handle an impressive array of tough and simple production jobs.

* If you count the pictures, you come to number 9. But that's certainly not the total of packers made by Baker. For instance, Models "J" & "K" Snap-Set Packers are also made in double-grip versions. Model "E" is also offered with integral one-shot unloader, or with unloader and hold-down. Moreover, thanks to Baker's continuing program of packer research and development, new packers that will supplement the packers pictured above are coming.

Drillable

BAKER MODEL "F" RETAINER PRODUCTION PACKER

Product No. 415-F

Related design to Model "D". Contains larger continuous bore than Model "D" Used where extra large bore is required in some parallel (triple) string, flowing or pumping hookups.

BAKER MODEL "FA" RETAINER PRODUCTION PACKER

Product No. 415-FA

Related to the Model "F" Packer in the same manner that the Model "DA" is to Model "D". Contains extra large upper sealing bore. Provides largest I.D. of any retainer-type packer. Used in multiple string hookups exclusively.

These are Retrievable

BAKER MODELS "J" AND "K" SNAP-SET DUAL PACKERS

Used as the upper retrievable packers in two or three-packer, parallel-string installations. Provides largest full-opening bores possible. For instance, 7" size has full opening for two 2⅜" tubing strings. Actuated by set-down weight only, and can be set and released as many times as required. Short string can be run and retrieved separately. Model "J" is long-string set; Model "K" is short-string set. Also available are Double-Grip versions that contain built-in, button-type, hydraulic hold-downs.

(left)
Model "J" Single-Grip Snap-Set Dual Packer Product No. 756-J

(right)
Model "K" Single-Grip Snap-Set Dual Packer Product No. 756-K

BAKER MODEL "M" SNAP-SET PACKERS

Product No. 635-M

Used as the upper retrievable packer in two-packer, full-opening, selective cross-over, tubing and annulus production hookups. Set with set-down weight. Released and recocked for repeat setting by picking up on tubing.

BAKER MODEL "A" RETRIEVABLE TENSION PACKER

Product No. 739-A

One of the shortest, most modern high-performance tension packers. Ideal for economical, low- or high-pressure water flooding. Rugged enough for many high-pressure fracturing and acidizing operations. Simple J-Slot setting mechanism.

BAKER MODEL "E" RETRIEVABLE CASING PACKER

Product No. 420-E

One of the shortest, most compact, set down retrievable packers available. Ideal for light or medium duty production requirements, or for all-around water flooding use. Simple J-Slot setting mechanism.

BAKER

BAKER OIL TOOLS, INC.
HOUSTON
LOS ANGELES
NEW YORK

Baker packers don't go into the field alone. One of the great domestic oilfield service organizations stands behind them. Parts are always available, and so is service. So is the latest practical knowledge of how to use packers and how to set them.

BAKER

THE

TREMENDOUS EXPERIENCE

OF

Moore

ENGINEERING & MANUFACTURING

IS AVAILABLE IN RESOLVING YOUR PROBLEMS OF

DRILLING STRUCTURES

FOR MORE THAN FIFTY YEARS

LEE C. MOORE

C O R P O R A T I O N

P. O. Box 216 • Tulsa, Oklahoma • Dallas • Houston • New Orleans • Casper • Odessa • Great Bend • Pittsburgh • EXPORT OFFICE: Room 624, International Bldg., 630 5th Avenue, New York 20, N. Y. Foreign Licensed Mfr.: Oil Well Engineering Co., Ltd., Cheadle Heath, Stockport, England

Move the man off the monkey-board

GUIBERSON

*Type **H** Hydraulic*

WIRE LINE OIL SAVER

Hydraulically operated, Guiberson's Type H Wire Line Oil Saver is controlled remotely by applying or releasing hydraulic pressure through a 50' hose from pump to saver. The Type H effectively and uniformly cleans the wire line. This keeps the working area and equipment free of well fluids, reducing the hazards of fire and accident. Comply with Guiberson's slogan, "Better Be Safe Than Sorry," by using the Type H. There is no need for a man on the monkey-board during swabbing and redressing operations, which should please your insurance company.

Advantages of Type H Saver:

Hydraulically operated by field-proved piston principle . . no trouble-causing rubber bladders or complicated mechanism.

Large rubber and generous bushings give a smooth, constant seal. Rubber can be used until almost completely consumed.

Ram has 2½" hydraulic stroke with spring-actuated return.

Non-sparking, durable split bushings . . top and bottom interchangeable.

Saver is quickly and economically redressed at top of unit . . no threaded connections.

Bushings and rubbers for ⅜" to ⅝" or ¾" to 1" line.

Remotely controlled . . allows at least 50' leeway from saver to pump.

For swabbing, gun perforating and other wire line operations, put the Type H to work. Ask your Guiberson man for a demonstration.

Long-life packing rubber and bushings.
Corrosion-resistant brass body.
Pressure gauge with marked operating ranges also indicates degree of rubber wear.
Redressing tool.
Hand controlled pressure relief valve.
Hydraulic pump with base.
Convertible to any field connection by changing only the base.
Fluid-filled 50-foot hose with check valve each end.

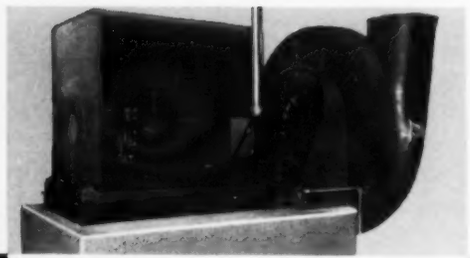
Sold by
Oil Field Supply Stores
Everywhere

THE GUIBERSON CORPORATION
DALLAS, TEXAS, U. S. A.

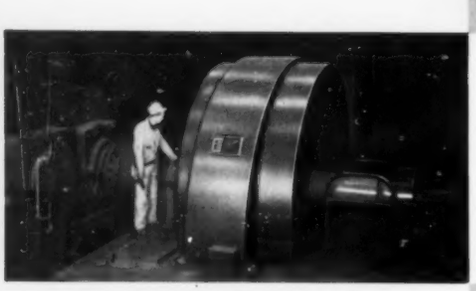
GUIBERSON — PRODUCTION, DRILLING AND WORKOVER SPECIALTIES, MOLDED RUBBER PRODUCTS

DRESSER INDUSTRIES INC. — OIL • GAS • ELECTRONICS CHEMICAL • INDUSTRIAL

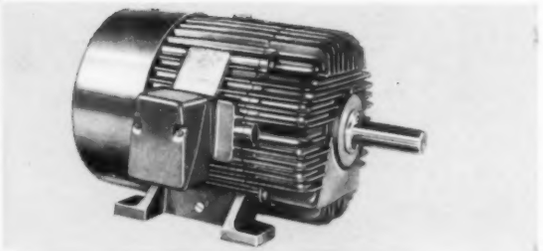
IMPORTANT NEWS FOR



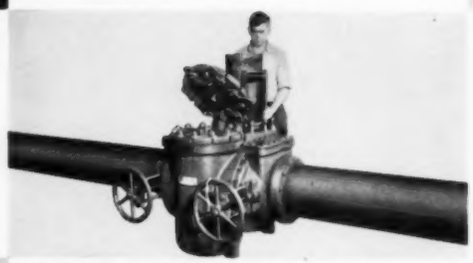
COMPRESSORS Single or multistage, centrifugal or axial, inlet capacity to approximately 600,000 cfm, turbine or motor driven. This 25,650 inlet cfm compressor is motor-driven.



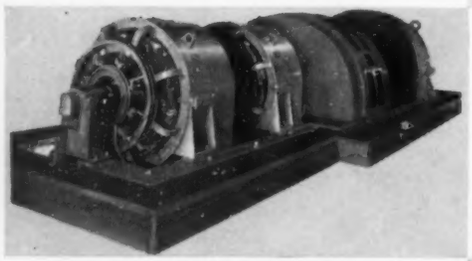
SYNCHRONOUS MOTORS Designs range from 100 to 100,000 hp for direct, belt or gear drive. This 6000-hp machine drives steel mill roughing stands.



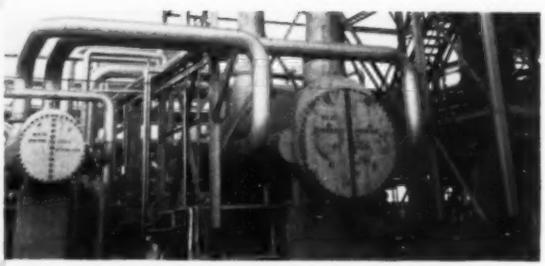
CROCKER-WHEELER INTEGRAL HP MOTORS New NEMA rerate line of a-c motors includes the ribbed frame TEFC construction, pioneered by Crocker-Wheeler.



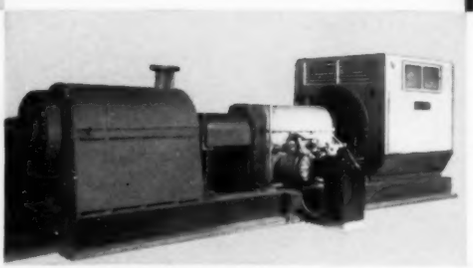
STRAINERS Proven for over 50 years in power and industrial plants everywhere, removing objectionable solids that could cost much in lost time and damage.



MOTOR-GENERATORS From 250 to 6000 kw. This five-unit m-g set, serving a reversing cold mill, is driven by a 4500-hp, 13,200-volt synchronous motor.



EJECTORS From size of a man's hand to the giant twin three-stage ejectors partially shown above, serving world's largest crude oil unit.

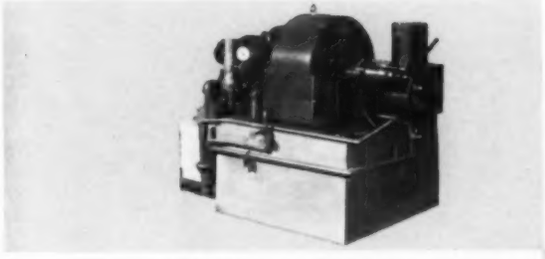


INDUCTION MOTORS Two-pole machines (350 to 10,000 hp) include this 2500-hp "super-quiet" boiler-feed pump driving motor. Also, four or more poles (500 to 10,000 hp).

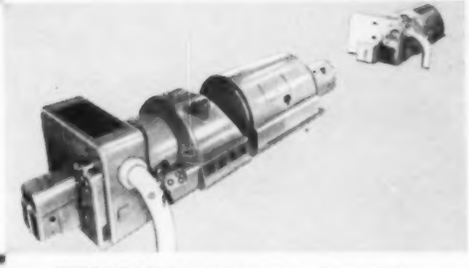
THE PETROLEUM INDUSTRY

These famous ELLIOTT products are now offered through the world-wide sales and service facilities of Carrier International Ltd.

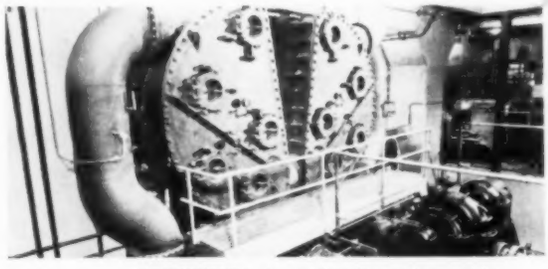
Shown on these pages are a few of the many fine products of the Elliott Company used by the petroleum industry. For complete information, write Industrial Equipment Sales Dept., Carrier International Ltd., 385 Madison Avenue, New York 17, N.Y.; Carrier A. G., Zurich, Switzerland, or Carrier-Lix Klett S. A., Buenos Aires, Argentina.



MECHANICAL DRIVE TURBINES Single-stage and multistage in practically any required horsepower, speed, inlet and back pressure. Reduction gears (built in or coupled).



TURBINE-GENERATORS Engineered and built as a unit by Elliott. Two 22,000-kw hydrogen-cooled units are seen here.



CONDENSERS A complete line of barometric and surface types. Here is a 30,000-sq.-ft. Elliott surface condenser of divided water-box construction.

Carrier

REASON: *General's skilled crews PLUS unmatched laboratory support*

General's field crews are fully trained and experienced. Work in almost every important oil zone in the world has given us the specialized knowledge needed for accurate mapping of new or old areas. General's crews are equipped with precision-performance instruments that are often unique in their ability to withstand heavy duty and still give sensitive and accurate recordings.

This combination of seasoned crews and outstanding equipment and instruments is your best assurance of success. Find out for yourself the reasons behind General's reputation for outstanding field work. Call General today . . .

General
GEOPHYSICAL COMPANY
Houston Club Building • Houston, Texas

Paris, France
Edmonton, Alberta
Nassau, Bahamas
Tripoli, Libya

When your contract is with General, the percentage for successful exploration is in your favor!

Continental-Emsco's

PRE-OVERSEAS RIG ASSEMBLY

. . saves costly time in isolated drilling areas

Prior to overseas shipment, careful, accurate and complete assembly and inspection is made of each piece of your equipment. After this thorough inspection, all parts fit and are ready for operation.

Inspection standards are uniform throughout all C-E manufacturing plants in U.S.A., France, England and Italy. Full responsibility is centered at each facility, so plant management is well aware of your needs. Delays for home office approval are eliminated . . modifications are quickly, inexpensively made.

This optional item-by-item assembly and inspection means C-E and related equipment is complete . . ready to perform . . with no profit-wasting delays . . even in remote drilling or producing fields.

For Service that Sings . . Equipment that Hums . . Go . .

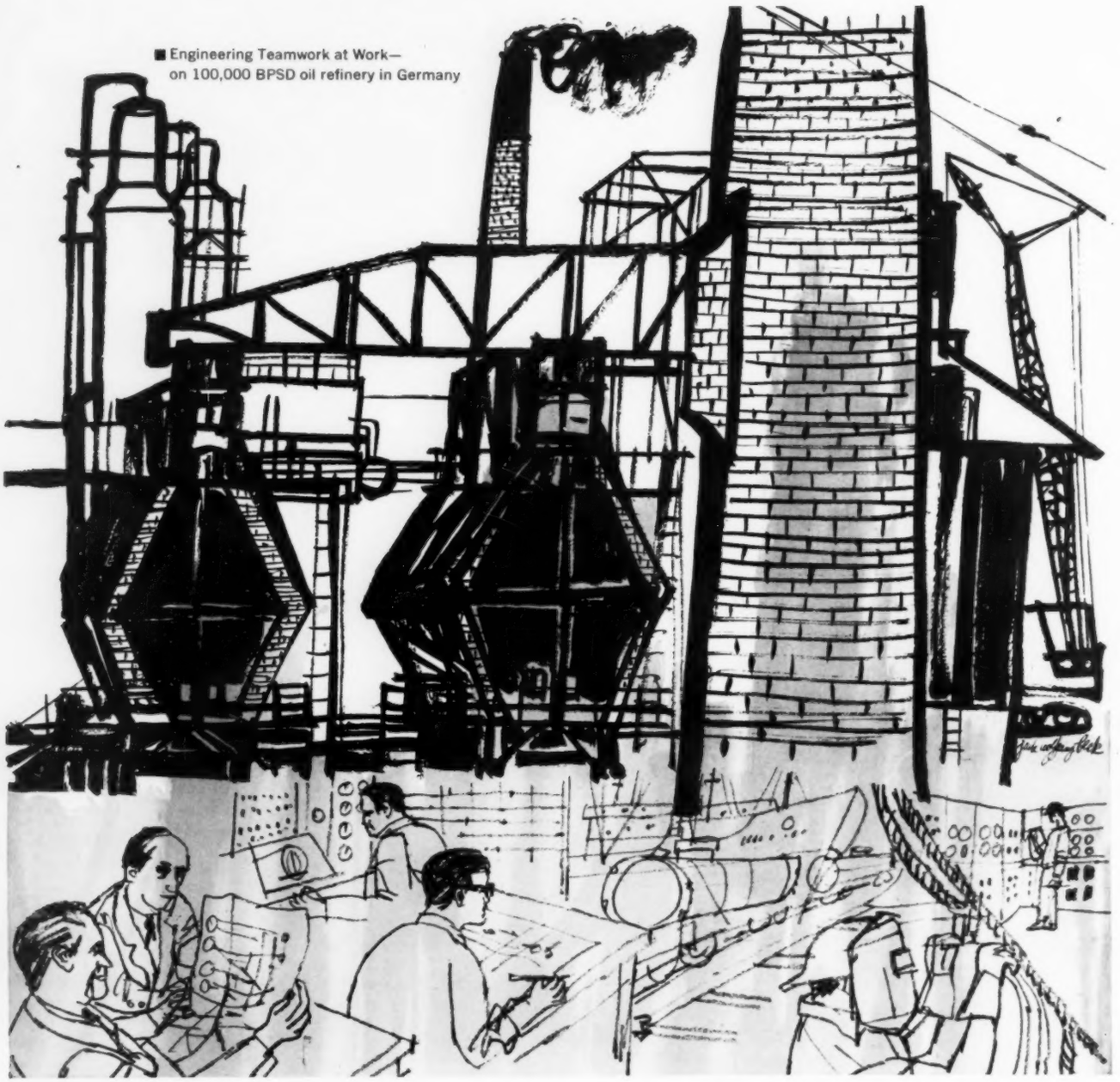
CONTINENTAL-EMSCO

Serving the Oil and Gas Industries . . . Worldwide

CONTINENTAL-EMSCO COMPANY • A Division of The Youngstown Steel and Tube Company • General Offices: Dallas, Texas • Export Division: 30 Rockefeller Plaza, New York 20, N. Y. • Continental-Emsco Company Limited • General Offices: Calgary, Alberta, Canada • Continental-Emsco Company C. A., Caracas, Venezuela • Plants: Houston and Garland, Texas; St. Albans, Herts., England • Representatives in All Principal Oil Fields of the World

TS 902

■ Engineering Teamwork at Work—
on 100,000 BPSD oil refinery in Germany



NEWEST RHINELAND REFINERY

A major contribution to West Germany's dynamic industrial growth is the giant new grass roots refinery of BP Benzin und Petroleum A.G. at Dinslaken. When fully completed, in 1961, it will increase the Republic's domestic source of gasoline, oil, and other petroleum products by 100,000 BPSD.

A huge and complex undertaking, this new refinery is the result of close coordination of effort among American, British, and German engineers. Each is making important and specific contributions to the over-all project.

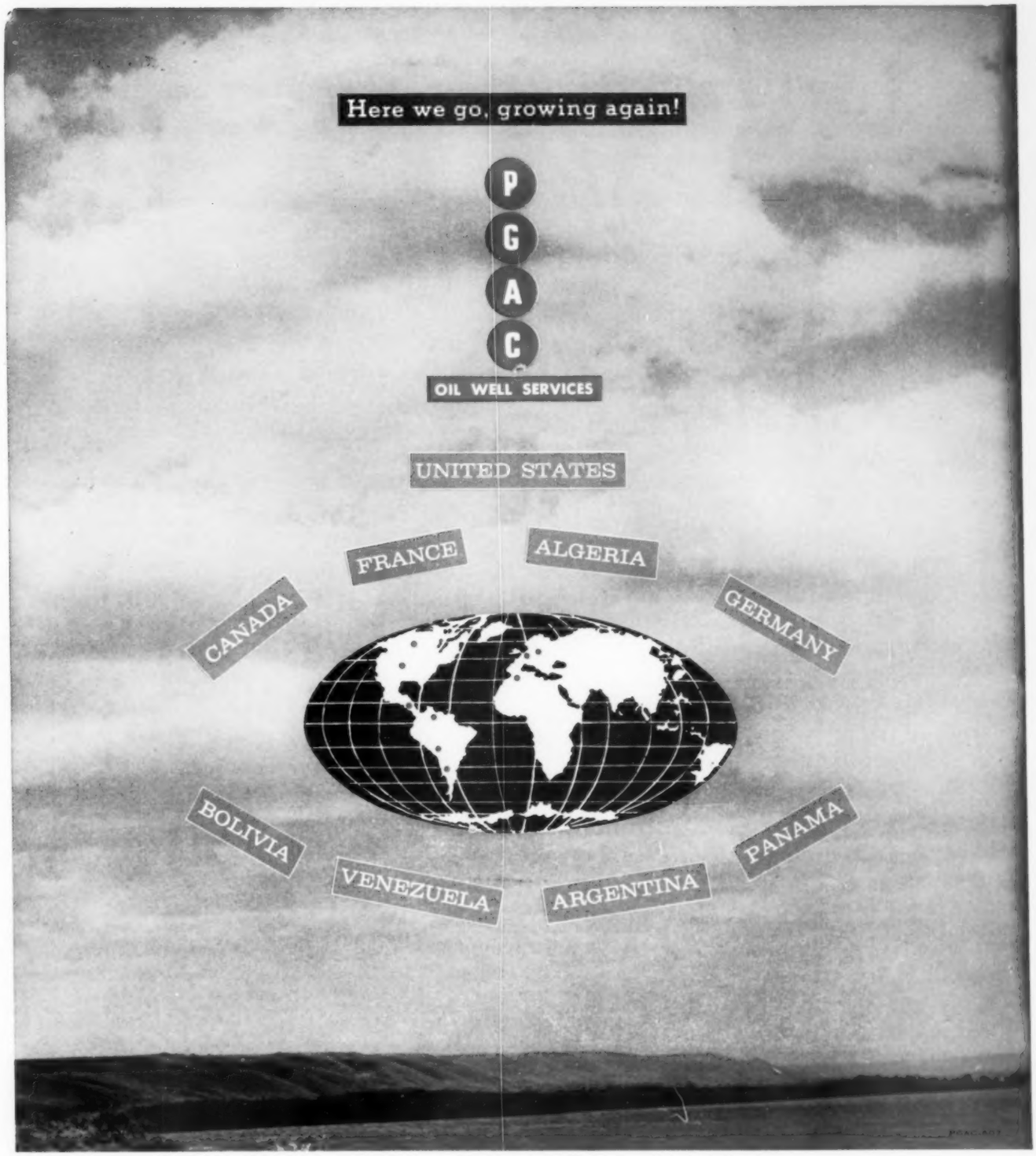
Advisory and consultant services are being rendered BP in Germany on many phases of the undertaking by Kellogg Refinery Consultants, Ltd., Dusseldorf. These include procurement of materials and equipment, construction, operator training—as well as advice to BP Benzin und Petroleum A.G. on the testing and start-up of its refinery. Most of the materials and equipment have been supplied by German industry.

Fried. Krupp, Industriebau has worked closely with Kellogg on the project from inception through construction.

If you are planning to build new processing facilities at home or abroad, Kellogg would be glad to show you how its coordinated engineering-procurement-construction services could work to your company's economic advantage. Please address inquiries to The M. W. Kellogg Company, 711 Third Avenue, New York 17, N. Y.

THE M. W. KELLOGG COMPANY / A Subsidiary of Pullman Incorporated

Offices of other Kellogg companies are in Toronto, London, Paris, Rio de Janeiro, Caracas, Buenos Aires



PAN GEO ATLAS CORP.

7730 Scott Street Phone: RIverside 7-1300 Houston, Texas

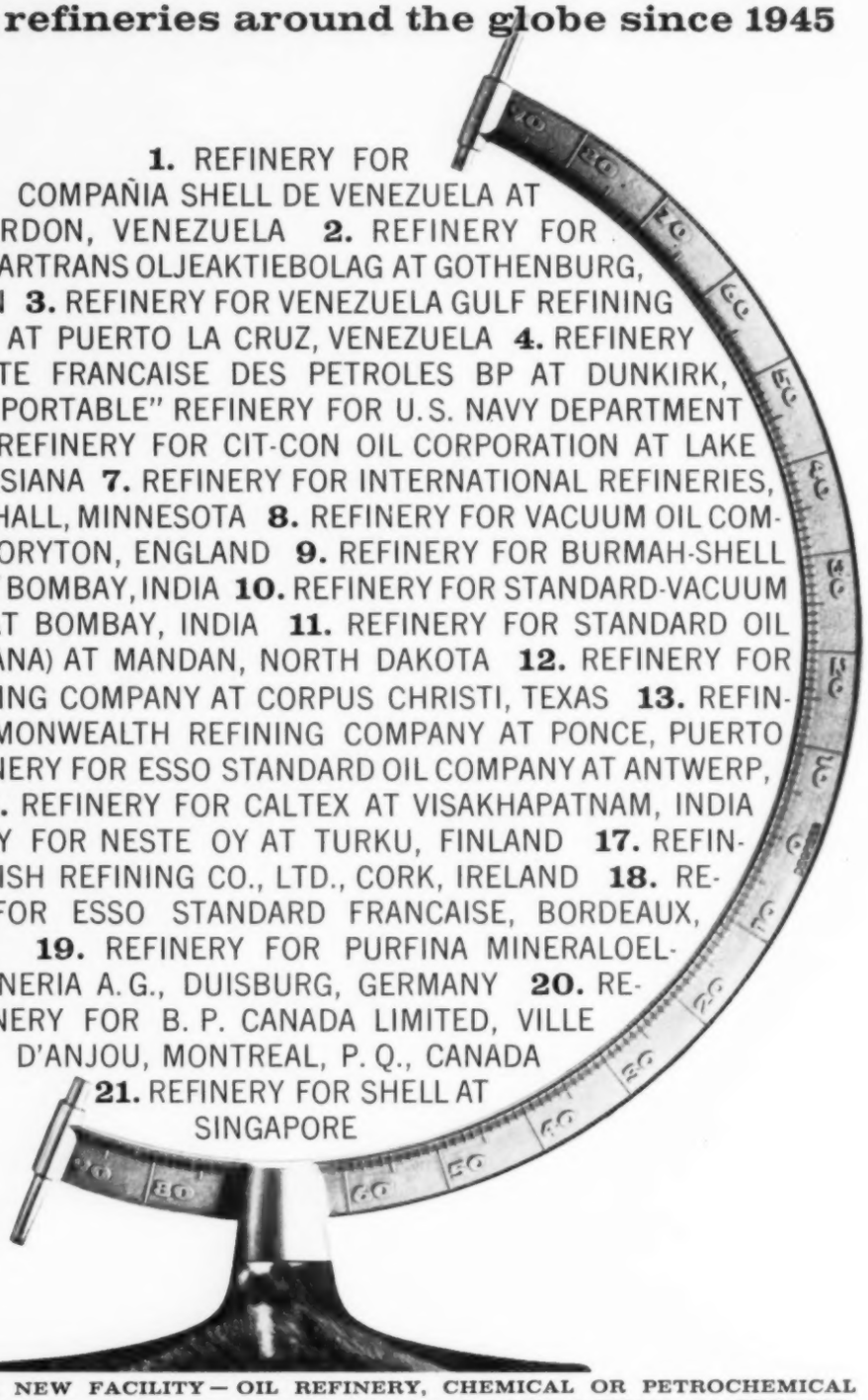
PGAC

CHEMETRON

PGAC SUBSIDIARIES

CANADA: Perforating Guns of Canada, Ltd. FRANCE and ALGERIA: PGAC Sahara, S.R.L. ARGENTINA: Servicios Tecnicos Atlas, S. A.
VENEZUELA and BOLIVIA: Servicios Tecnicos Atlas, C. A. PANAMA: International Technical Services, S. A.
GERMANY: Deutsch-Amerikanische Olfelddienst, G.m.b.H. UNITED STATES: PGAC Development Company

21 complete refineries around the globe since 1945



1. REFINERY FOR COMPAÑIA SHELL DE VENEZUELA AT CARDON, VENEZUELA **2.** REFINERY FOR KOPPARTRANS OLJEAKTIEBOLAG AT GOTHENBURG, SWEDEN **3.** REFINERY FOR VENEZUELA GULF REFINING COMPANY AT PUERTO LA CRUZ, VENEZUELA **4.** REFINERY FOR SOCIETE FRANCAISE DES PETROLES BP AT DUNKIRK, FRANCE **5.** "PORTABLE" REFINERY FOR U.S. NAVY DEPARTMENT **6.** LUBE OIL REFINERY FOR CIT-CON OIL CORPORATION AT LAKE CHARLES, LOUISIANA **7.** REFINERY FOR INTERNATIONAL REFINERIES, INC. AT WRENSHALL, MINNESOTA **8.** REFINERY FOR VACUUM OIL COMPANY LTD. AT CORYTON, ENGLAND **9.** REFINERY FOR BURMAH-SHELL OIL COMPANY AT BOMBAY, INDIA **10.** REFINERY FOR STANDARD-VACUUM OIL COMPANY AT BOMBAY, INDIA **11.** REFINERY FOR STANDARD OIL COMPANY (INDIANA) AT MANDAN, NORTH DAKOTA **12.** REFINERY FOR SUNTIDE REFINING COMPANY AT CORPUS CHRISTI, TEXAS **13.** REFINERY FOR COMMONWEALTH REFINING COMPANY AT PONCE, PUERTO RICO **14.** REFINERY FOR ESSO STANDARD OIL COMPANY AT ANTWERP, BELGIUM **15.** REFINERY FOR CALTEX AT VISAKHAPATNAM, INDIA **16.** REFINERY FOR NESTE OY AT TURKU, FINLAND **17.** REFINERY FOR IRISH REFINING CO., LTD., CORK, IRELAND **18.** REFINERY FOR ESSO STANDARD FRANCAISE, BORDEAUX, FRANCE **19.** REFINERY FOR PURFINA MINERALOELRAFFINERIA A.G., DUISBURG, GERMANY **20.** REFINERY FOR B. P. CANADA LIMITED, VILLE D'ANJOU, MONTREAL, P. Q., CANADA **21.** REFINERY FOR SHELL AT SINGAPORE

WHEN YOU PLAN A NEW FACILITY — OIL REFINERY, CHEMICAL OR PETROCHEMICAL PLANT—LUMMUS CAN PUT 50 YEARS OF EXPERIENCE ON MORE THAN 850 PROCESS-INDUSTRY PLANTS THROUGHOUT THE WORLD AT YOUR DISPOSAL.

LUMMUS

THE LUMMUS COMPANY, 385 MADISON AVENUE, NEW YORK 17, N. Y.

NEWARK, N. J. • WASHINGTON, D. C. • HOUSTON • MONTREAL • PARIS • THE HAGUE • LONDON • MADRID

WORLD PETROLEUM REPORT

AN ANNUAL REVIEW OF INTERNATIONAL OIL OPERATIONS

VOLUME VII—FEBRUARY 15, 1961

TABLE OF CONTENTS

AREA STUDIES

19 WORLD REVIEW
37 EUROPE
187 NORTH AFRICA
205 CENTRAL & SOUTH AFRICA
219 MIDDLE EAST
233 SOUTH AMERICA
255 CENTRAL AMERICA
267 NORTH AMERICA
279 FAR EAST

NATIONAL STUDIES

219 Abu Dhabi
219 Aden
219 Afghanistan
267 Alaska
275 Albania
192 Algeria (OCRS)
205 Angola
234 Argentina
279 Australia
44 Austria
255 Bahama Islands
219 Bahrain
255 Barbados
216 Basutoland
214 Bechuanaland
51 Belgium
239 Bolivia
242 Brazil
280 British Borneo
239 British Guiana
256 British Honduras
214 British Togoland
275 Bulgaria
280 Burma
274 Canada
205 Cameroons (French)
281 Ceylon
233 Chile
243 Colombia
276 Communist China
205 Congo (Leopoldville)
256 Costa Rica
256 Cuba
46 Cyprus
276 Czechoslovakia
216 Dahomey
46 Denmark
258 Dominican Republic
276 East Germany
245 Ecuador
200 Egypt
48 Eire (Ireland)
258 El Salvador
174 England (UK)
206 Eritrea
206 Ethiopia
182 European Equipment Index
67 Finland
53 France
192 French Sahara (OCRS)
216 French Somaliland
206 Gabon
212 Gambia
69 Germany (West)
206 Ghana
135 Greece
261 Guatemala
216 Guinea
255 Haiti
138 Holland (Netherlands)
258 Honduras
276 Hungary
284 India
281 Indonesia
221 Iran
226 Iraq
220 Israel
154 Italy
208 Ivory Coast
259 Jamaica
285 Japan
219 Jordan
208 Kenya
281 Korea (South)
227 Kuwait
279 Laos
230 Lebanon
208 Liberia
188 Libya
208 Madagascar (Malagasy Republic)
287 Malaya
210 Mali Republic
67 Malta
216 Mauritania
260 Mexico
202 Morocco
208 Mozambique
219 Muscat & Oman
138 Netherlands
255 Netherlands West Indies
230 Neutral Zone
279 New Caledonia
279 New Guinea
281 New Zealand
259 Nicaragua
210 Niger
210 Nigeria
67 Norway
216 Nyasaland
282 Pakistan
262 Panama
283 Papua
238 Paraguay
246 Peru
286 Philippines
276 Poland
146 Portugal
210 Portuguese Guiné
263 Puerto Rico
227 Qatar
216 Rhodesia (Northern)
216 Rhodesia (Southern)
277 Romania
275 Russia
214 Sao Tome & Principe
230 Saudi Arabia
212 Senegal
146 Sicily
216 Sierra Leone
279 Singapore
212 Somali (Republic of)
214 South Africa (Union of)
214 South West Africa
162 Spain
212 Spanish Guinea
212 Spanish Sahara (Rio de Oro)
214 Sudan
245 Surinam (Dutch Guiana)
216 Swaziland
170 Sweden
173 Switzerland
231 Syria
282 Taiwan
214 Tanganyika
283 Thailand (Siam)
284 Timor
216 Togoland
263 Trinidad
219 Trucial Coast
202 Tunisia
222 Turkey
216 Uganda
275 U.S.S.R.
174 United Kingdom
268 United States
216 Upper Volta
254 Uruguay
248 Venezuela
287 Vietnam
231 Yemen
277 Yugoslavia
212 Zanzibar

Published Annually by

MONA PALMER PUBLISHING CO., INC.

HEAD OFFICE: 25 W. 45th St., New York 36, New York, USA

LONDON OFFICE: St. Paul's Corner, Ludgate Hill, London, E.C. 4, England

CONTINENTAL EUROPE OFFICE: 231 Forchstrasse, Zurich 32, Switzerland

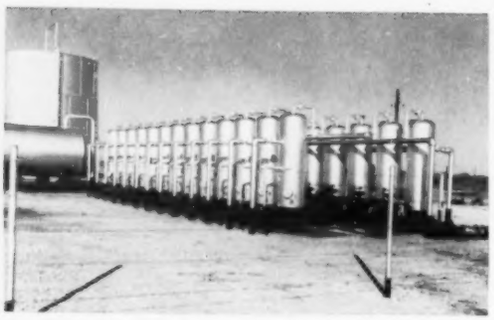
GORDON H. BARROWS
Editor

ELOISE MICHEL
Associate Editor

DORIS N. O'HARA
Production Manager

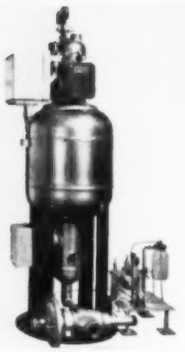
CHARLOTTE BLASS
Art Director

"This publication is designed to provide accurate and authoritative information in regard to the subject matter covered. It is sold with the understanding that the publisher is not engaged in rendering legal, accounting, or other professional service. If legal advice or other expert assistance is required the services of a competent professional person should be sought." From a declaration of principles adopted by a committee of the American Bar Association and a committee of Publishers and Associations. © Mona Palmer Publishing Co., Inc., 1961.



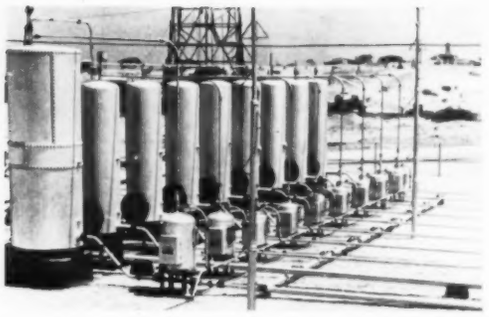
1

Battery of Twenty-seven METROL Type C Two Phase Metering Separators, 24″ O.D. x 6′ S. to S. x 125 psi W.P. These vessels separate oil and gas and meter the oil in one barrel increments in lower compartment. Available in sizes of ¼, ½, 1, 2, 5, 10, 20, and 30 barrels per dump and working pressures of 125, 300, 600, and 1200 psi to handle volumes from 0 to 20,000 BPD.



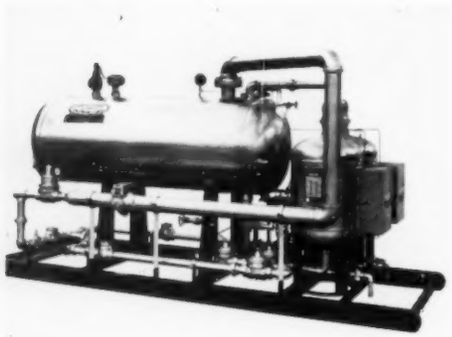
2

METROL Type FV Vol-U-Meter® with Automatic B.S.&W. Sampler and Production Time Recorder. Unit shown is designed for 1800 psi W.P. and meters one barrel per dump. Available in sizes of ¼, ½, 1, 2, 5, 10, 20, and 30 barrels per dump, working pressures of 125, 300, 600, 1200, 1800, 2000, 2400, 3000 and 4000 psi to handle volumes from 0 to 20,000 BPD.



3

Battery of Nine METROL CV Vol-U-Meters® with Liquid Transfer Case feature. These Units meter the liquid and transfer (pump) it from low pressure to higher pressure by use of gas pressure. Available as meters only (CV Vol-U-Meters) or as Combination meters and transfer cases (blow cases) as shown above. Available in sizes of ¼, ½, 1, 2, 5, 10, 20 and 30 barrels per dump, working pressures of 125, 300, 600 and 1200 psi to handle volumes of from 0 to 20,000 BPD.



4

METROL Three Phase Well Tester® Unit separates oil, water and gas and meters oil and water in METROL® CV Vol-U-Meters. Separator is 30″ O.D. x 6′ S. to S. x 125 psi W.P. Vol-U-Meters discharge ½ barrel per dump. These Separators and Vol-U-Meters are available in working pressures of 125 300, 600, and 1200 psi and sizes of 16″, 20″, 24″, 30″, 36″, 48″ and 60″ O.D. to handle volumes of 0 to 12,000 barrels per day. Available skid or trailer mounted. Other type units available for working pressures up through 4000 psi.

OIL METERING and Processing EQUIPMENT CORP.

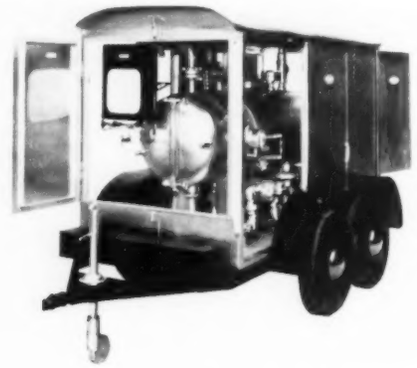
MELROSE 5-1226 • 4843 YALE STREET
HOUSTON 18, TEXAS

METROL®

Oil Metering & Processing Equipment Corp. manufactures METROL (Trade Mark) metering, treating and testing equipment which includes Two and Three Phase Separators, Metering Separators, Metering Treaters, Metering Free Water Knockouts, Well Testers, Vol-U-Meters, Samplers, Free Water Knockouts and special production equipment.

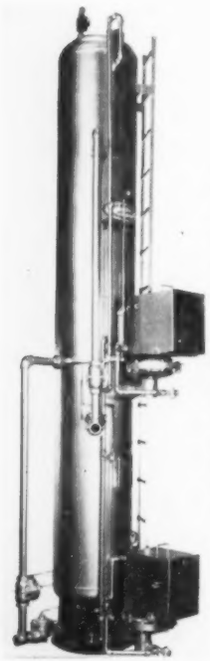
We solicit your inquiries.

Cable Address: METROL, Houston, Texas, U.S.A.
Mail Address: P. O. Box 10777, Houston 18, Texas



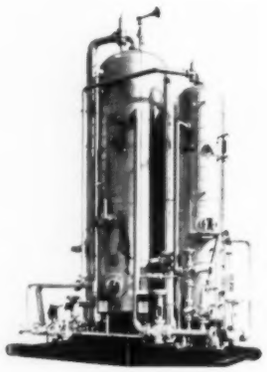
5

METROL Two Phase Well Tester® Unit separates well fluid into liquid and gas and meters liquid with Positive Displacement Meter. Gas is metered with an orifice meter. Separator is 30″ O.D. x 6′ S. to S. x 300 psi W.P. Unit is enclosed for cold weather operation. These two phase Separators are available in working pressures of 125, 300, 600, 1200, 1500, 2,000, 2,400, 3,000 and 4,000 psi and sizes of 16″, 20″, 24″, 30″, 36″, 48″ and 60″ O.D. to handle volumes of 0 to 20,000 BPD. Available skid or trailer mounted.



6

METROL Type EHX Two Phase Metering Separator. This unit separates the oil and gas in two separate tiered compartments and meters oil in these same compartments. Metering is obtained on "weight" basis by means of METROL Hydrostatic Head Liquid Level Controller. Unit designed especially for metering large volumes of heavy, viscous, foaming oil with accuracy up to 99.9%. Available in sizes of 24″, 30″, 36″, 48″, 60″, and 72″ O.D. and working pressures of 125, 230, 300, and 500 psi to handle volumes of 0 to 60,000 BPD.



7

Skid Mounted Production Unit including METROL 48″ O.D. x 16′ S. to S. x 500 psi W.P. Two Phase Type CHX Metering Separator and METROL 72″ O.D. x 20′ S. to S. x 500 psi W.P. Two Phase Oil and Gas Separator. Unit includes 6″ Gas Run on 48″ Separator and 8″ Gas Run on 72″ Separator to meter gas. The CHX Metering Separator used on this unit utilizes the METROL Hydrostatic Head Liquid Level Controller and meters the oil on a "weight" basis. This CHX Unit can be used to accurately meter large volumes of heavy, viscous, foaming crude oil. Similar production units are available in various combinations to handle most any volume of well fluid and to meet special conditions.

8

METROL Type F Metering Separator. Vessel is 30″ O.D. x 10′ S. to S. x 2400 psi W.P. Unit separates oil and gas and meters oil in lower compartment with Seraphin Necks. Available in sizes of ¼, ½, 1, 2, 5, 10, 20 and 30 barrels per dump and working pressures of 125, 300, 600, 1200, 1800, 2000, 2300, 3000 and 4000 psi to handle volumes of 0 to 20,000 BPD.

Registered trade names: Metrol, Well Tester, Vol-U-Meters.

WORLD

The world scene is dominated by the need for markets, with crude productive capacity outrunning available markets by some 25%. By 1964, excess capacity is expected to still exist, although decreased to a workable 18%. Exploration continues unabated, with good oil finds made during 1960 in Libya, Turkey, Canada, Colombia, Iran, and Bolivia. A crushing *NO* was delivered Brazil's exploratory campaign, however.

World refining capacity increased 3.7% in 1960, reaching 23,426,100 b/d. One new hydrocracking process was announced in 1960—the Lomax process of Universal Oil Products Co.

Crude prices declined sharply under pressure from increased world production levels, and competition from the Russians.

Major oil-law changes occurred in several countries, and governmental participation in oil operations continued to increase.

Attention is called particularly to the Europe introductory section for a special article on the European impact on oil of new international economic organizations such as OEEC on oil.

EXPLORATION: Excess producing capacity did not slow the world's exploratory campaign. Major expenditures are being made in anticipation of a demand for oil which will use up all known reserves within 20 years. The task of replacing these reserves, some 300 billion barrels, is a mammoth one which cannot wait till the present surplus is past, since there is often a 10-year lag between a major discovery and its full arrival of its oil on the market.

In Canada, what has been defined as the biggest oil discovery in **North America** since East Texas, the Swan Hills field, has been put on a wide 340-acre spacing to bring down costs. Exploration has continued, but no discoveries of similar size were found in 1960. Alaska had a small find, and natural-gas discoveries appear locally important. The United States, for all its vast oil industry, made no discoveries in the major class during 1960, based on presently available information. Mexico, likewise, had no reports of major oil finds.

In **Latin America,** only Venezuela, Colombia, and Bolivia hit the piñata. Venezuela had its thickest oil sand to date in a Lake Maracaibo well drilled by Sun Oil et al. Colombia had its first find in the inaccessible Llanos region when Texaco made a discovery there. Size is still to be determined, but it is the first find in this region. Bolivia also had a discovery, made by Gulf Oil, in the far interior. The well did not look large—only about 500 b/d—a small fraction of the reserves which would be necessary to build a $500 million pipeline to the coast. No other country in the area made a noteworthy discovery, although Argentina's production continued to rise sharply. Brazil got a resounding negative to her exploration campaign, a crushing end to the world's most expensive effort by one company in one country.

Europe had a bad exploration year. However, exploration is still in its infancy in many parts of the continent, and substantial reserves may be found there in the future. Germany continued to be the largest producer, and eight new oil fields were found there in 1960, along with two gas fields. However, most of these are related to previous oil- or gas-bearing structures. The total for 1960 is less impressive than for 1959, when 14 oil finds and seven gas discoveries were made.

The area of exploratory interest in France was reduced during 1960. Some extensions to previous oil finds were made, but there were no new developments during 1960.

No oil finds were made in any of the other countries of Europe, although concerning the communist areas detailed information is lacking. England continued her exploratory campaign, and gained some interest during 1960 when Esso picked up permits on the south coast late in the year. Interest there was due to the possibility that the French basins extended under the channel into England. In the north of England, too, some excitement was aroused by gas discoveries in The Netherlands, which companies hoped might be duplicated in England where a growing market is hungry for fuel supplies.

Italy had no find, despite three exploration wells drilled by Cities Service and Pan American, the first by international capital since the 1957 oil law was passed. Spain has yet to see her full-fledged exploratory effort. Prospectors caused some excitement by ficticious reports of oil finds, but these were later proved false.

For the past several years, **Africa** has been the happy hunting ground for oil prospectors. All of North Africa has oil now, except Tunisia, and more is to be found. Several good finds were made in 1960 in Libya, where Esso and Ohio companies added to their reserves, and more are in the wind. Egypt had no fireworks in 1960; but, if the Western Desert area is ever finally opened to exploration, there may be some excitement.

Algeria had a new oil find by CEP, and the discovery of oil accumulations in the Lower Devonian and the Cambrian in Tan Emellel and a gas find at Ténéré El Beugra and Taouratin were encouraging. Discoveries in the Tinrhert plateau and the favorable results in the Cambro-Ordovician of the eastern zone stimulated interest in the basin's western half covered by the Erg (Sand Sea) Issaouane and until now little explored.

Morocco continued its slow progress. Interest in the country has heightened recently. Pan American International holds preliminary permits to look the country over; and ENI, the Italian government's company, is actively drilling. The Spanish Sahara lost a little of its bloom when Gulf's first tests there were dry. There will be more drilling in 1961, but the prospects are not bright.

Elsewhere in Africa, Nigeria (on the west coast) and Somalia (just about straight across the continent from Nigeria on the eastern coast) held the center of the stage—Nigeria, because Shell's production there is starting to rise appreciably; Somalia, because the first oil find ever made in the area has turned up. The rest of Africa had a moderate amount of activity—extending all the way down to South West Africa, where an independent American company took out a large permit area.

Asia and Australasia continued to walk a straight and narrow path—no deviation from the pattern established for years. No oil finds of major importance were made anywhere in that part of the world. Australia was trying hard, but still not finding. The Philippines had a small oil find, but it was "waxing" badly and hard to produce. India, Pakistan, Burma, Indonesia—all these and the rest of the Asian countries—are starved for energy to feed a growing population, but for a variety of reasons found no oil.

Geophysical Activity in 1959*: Geophysical activity by the petroleum industry in 1959 (1960 data are not available) was reduced in all the major areas of the free world except in the Far East, where a small overall gain was reported. An average of 957 geophysical crews of all types operated in worldwide exploration during the year. In 1956, a record high year, the worldwide average was 1,136 crews. References have been made in the literature concerning geophysical work in the Soviet Union, China, and other countries within their sphere of influence, but no information is available as to the amount of activity in those countries.

Drilling in the free world outside the United States and Canada was expected to total 5,505 well completions for 1960, an increase of about 7% over 1959. Continued active drilling in those areas in future years also is foreseen. USA completions are estimated to have declined to 46,324 in 1960 from 49,331 in 1959. Canada also was expected to decline to only 2,620 from 2,856, down 8.3%. Only 54,347 completions have been expected in the whole free world, against 57,230 in 1959, a decline of 5%.

PRODUCTION: World production of crude petroleum continued to rise during 1960. Argentina and Algeria showed the most spectacular increases, Argentina because of the increased activity by private drillers there, Algeria (OCRS) because the new pipelines are only now beginning to have a real effect.

Europe has slowly increased its production, but more slowly than the rise in consumption. North Africa is being looked to as a future source of supply for Europe, one which does not need the Suez Canal nor the Middle East, and North Africa showed a considerable increase during 1960. However, pipelines from Libya will not begin to flow oil to Euorpe until 1962, and production in Libya must await their completion.

The Middle East continued, meanwhile, to raise its production levels in a spectacular fashion. The percentage rate of increase is slowing down, but the volumetric rate is speeding up.

There are only four major oil sources in the world. One of them is Soviet Russia. Fortunately her oil production is just about balanced by

*Report of the Committee on Geophysical Activity of the Society of Exploration Geophysicists.

WORLD—Estimated Liquid Petroleum Producing Capacity

	Production Thous. Bbls. Daily	Capacity Daily	Production in % of Capacity %
Western Hemisphere			
United States (1) (2)	9,450	10,900	87
Canada (2)	850	1,400	61
Venezuela	3,400	4,000	85
Other Western Hemisphere	1,150	1,200	96
Total Western Hemisphere	14,850	17,500	85
Eastern Hemisphere			
Middle East	6,300	8,000	79
Africa (3)	1,100	1,350	82
Far East	700	800	87
Europe	350	350	100
Total Eastern Hemisphere	8,450	10,500	81
Total Free World	23,300	28,000	83
From Other Sources (4)	500	—	—
Total Supply	23,800	—	—
Estimated Consumption (5)	23,800		
(1) U. S. Crude	8,375	9,600	87
Natural Gas Liquids	1,075	1,300	83
Total	9,450	10,900	87
(2) U. S.	9,450	10,900	87
Canada	850	1,400	61
Total	10,300	12,300	84
(3) Algeria	550	670	82
Libya	400	500	80
Egypt & Others	150	180	83
	1,100	1,350	82

(4) Exports from Iron Curtain Countries to the Free World.
(5) Excluding stock changes.
(6) When pipeline outlets are completed.
Source: Paper by K. E. Hill, Eastman Dillon, Union Securities & Co.

WORLD—Trend in Unit Costs of Maintaining and Expanding Crude Production in the USA Compared with Other Areas, 1950-59

Year	United States	Canada	Venezuela	Middle East	Far East	Other Areas
	Per Barrel of Crude Production					
1950	$1.18	$6.99	$0.30	$0.13	$0.70	$0.45
1951	1.32	4.83	0.37	0.11	0.75	0.51
1952	1.58	5.47	0.42	0.17	0.88	1.03
1953	1.69	4.02	0.41	0.11	0.79	1.25
1954	1.86	4.01	0.39	0.11	0.82	1.21
1955	1.88	3.28	0.41	0.12	0.86	1.25
1956	1.94	2.85	0.81*	0.16	0.84	1.53
1957	1.95	2.61	0.95*	0.17	1.06	2.05
1958	1.73	2.51	0.58	0.21	0.88	2.31
1959	1.75	2.70	0.41	0.19	0.75	2.63
Average	1.70	3.29	0.53	0.16	0.84	1.59

*Includes $0.35 and $0.38 per barrel respectively for concessions.

WORLD—Functional Breakdown of Free-World Petroleum-Industry Fixed Assets, 12-31-59

	United States	Other Countries	Free World	United States	Other Countries
	Million Dollars			Percent of Total	
Gross Production	33,175	13,620	46,795	60.7	32.0
Pipelines	3,700	2,545	6,245	6.8	6.0
Tankers & Other Marine Equipment	1,525	8,835	10,360	2.8	20.8
Refineries	8,175	8,550	16,725	14.9	20.1
Chemical Plants	1,575	520	2,095	2.9	1.2
Marketing	5,600	7,450	13,050	10.2	17.5
Others	950	1,030	1,980	1.7	2.4
Total	54,700	42,550	97,250	100.0	100.0

her needs, so only a fraction is exported, but that fraction is very disturbing to world markets. During 1960 Russia increased her production, and for the first time assumed second place in the world's rank of oil-producing countries. The United States is first; Venezuela, third. Both the latter two areas showed only small increases. Venezuela was up about 4%, less than hoped for, and the United States rate of increase was even less.

One of the principal problems now facing the world petroleum industry is the excessive capacity to produce crude oil relative to anticipated demand. Free world production for 1960 represented about 75% of the estimated maximum efficient daily productive capacity. The pressure of this excess supply is causing highly competitive prices for both crude and products throughout the world, and lower profit margins in all divisions of the industry are its consequence. Productive capacity, as compared to current requirements, ranges from about 35% for Africa to 100% for Europe, where markets exist for all indigenous crude production. By 1964, all producing areas will be operating at a more satisfactory proportion of capacity, particularly Canada and North Africa. Required daily production will reach a level of about 23.4 million barrels, or 84% of the estimated capacity, as compared with about 76% in 1960.

Oil Production Trends: North America—In the United States, according to a report by consultant Walter J. Levy, the rate of finding new oil has been declining; on the other hand, improvement in methods of recovery could literally multiply the producibility from existing and future reserves. In Canada, there has been a fairly steady increase in additions to reserves. In view of the many uncertainties, recent increases to gross reserves in each country are taken as a plausible indication of future additions. These add up to 3.9 billion barrels a year. Together with existing reserves, and on the basis of a 13-year reserve-to-production ratio, North American resources would thus support production of 9.9 million b/d by 1970 as compared with 8.9 million b/d in 1960. This would represent expanded production at the rate of 1.1% per year, compared with 4.9% between 1950 and 1960. Significantly, North American production would then fall short of consumption by over five million b/d. In consequence, import requirements would mount to around 34% of total consumption, as against some 18% in 1960.

Latin America: In Venezuela, both exploration and development have been slowed. On the other hand, the oil search is being aggressively pursued in other countries, from Mexico to Argentina. On balance, a plausible assumption is that future discoveries will be in line with the experience of the 1950-60 decade, adding some two billion barrels per year.

Allowing for a decline in the reserve-to-production ratio, estimated 1970 Latin American production is five million b/d as compared with 3.6 million b/d in 1960—an increase of 3.2% per year between 1960 and 1970, compared with 6.3% between 1950 and 1960.

Eastern Hemisphere: Eastern Hemisphere production is projected at a rate sufficient to meet its own consumption plus North American import needs. On this basis, output would increase from 6.1 million to 14.7 million b/d during this decade, or at a rate of 9.2% per year. North African production in this total may rise from some 200,000 b/d to over two million b/d. All through this period, however, production potential in the Eastern Hemisphere is likely to exceed the projected level of actual demand for Eastern Hemisphere crude.

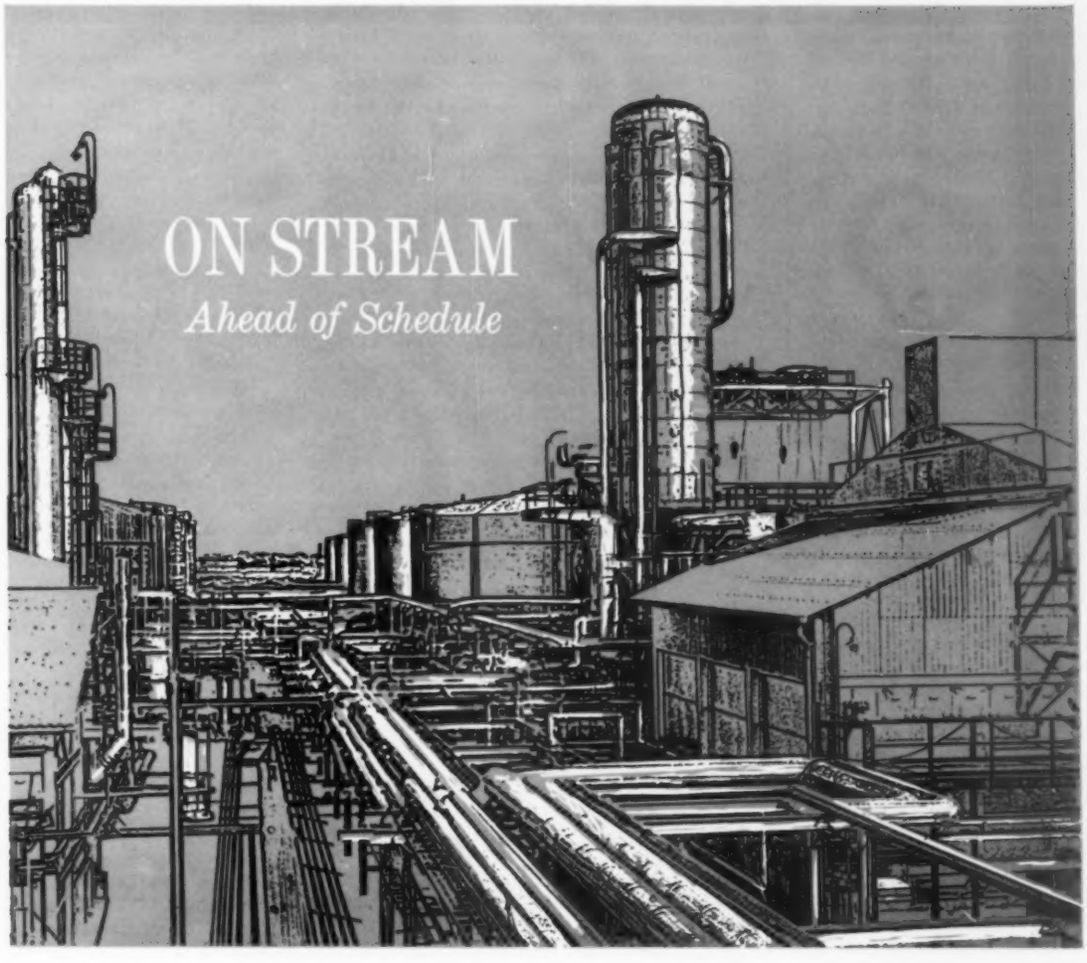
Reserves: World reserves of proved, recoverable oil are estimated at roughly 300 billion barrels (see table headed "World Functional Division of Major Petroleum Data—1960" for breakdown). This is equivalent to roughly 40 times annual consumption in 1960.

The division of reserves is roughly 60% in the Middle-East, 10% in the Communist Bloc, 15% in North America, 7% in the Caribbean, and 8% elsewhere. While the total of reserves appears ample, it would last only 20 years if no oil were found meanwhile. Therefore, the industry is seeking to make a gross addition to its proved reserves of some 300 billion barrels to maintain reserves and supply consumption over the coming 15 years, to 1975. This would maintain about a 15:1 ratio of reserves to production, which is considered ample. It would be about the same as the gross addition of 300 billion barrels made during the 15-year period preceding 1959.

Total ultimate world reserves of crude oil and gas liquids, recoverable by present conventional methods, have been estimated by geol-

WORLD—Eastern Hemisphere Petroleum Statistics
(Thousand Barrels Per Day)

	Forecast 1963
Consumption of Crude and Products	
Free E. H.	7600
Communist	3775
Total E. H.	11375
Total Exports (mostly crude)	775
Stock Change	100
Total Demand	12250
Crude Production	
Free E. H.	7350
Communist	4200
Total E. H.	11550
Imports:	
Crude	200
Products	500
Total E. H.	700
Total Supply	12250
Communist:	
Imports from Free E. H.	25
Exports to Free E. H.	400
Free Eastern Hemisphere:	
Refining Capacity	7700
Refinery Runs	6800



PARSONS

Look to Parsons for Performance.

The 30,000 BPSD refinery of Frisia Erdoelwerke, A. G. at Emden is the result of Parsons' engineering and construction "know-how." Parsons' engineers, working in conjunction with skilled subcontractors, have placed this modern facility on stream—several months ahead of schedule with considerable savings in construction costs... proof that you can "look to Parsons for Performance"!

The Ralph M. Parsons Company, Los Angeles. United States Offices: Pasadena, Houston, Huntsville, New York, Washington. International Offices: Asmara, Bangkok, Beirut, Cairo, Calgary, Dacca, Djakarta, Jeddah, Karachi, London, New Delhi, Paris, Teheran, Tokyo, Toronto.

WORLD-WIDE SERVICES: PETROLEUM-CHEMICAL ENGINEERING • CONSTRUCTION • ARCHITECT-ENGINEERING • ELECTRONIC SYSTEMS AND COMPONENTS • WATER DEVELOPMENT AND SYSTEMS • APPRAISALS AND ECONOMIC STUDIES • PLANT OPERATION • PERSONNEL TRAINING

ogist L. G. Weeks at 2,000 billion barrels. The former chief geologist for Standard Oil (New Jersey) estimated the "total ultimate liquid petroleum" reserves recoverable from both land and water areas by primary conventional methods at 85 billion barrels for Canada, 270 billion for the United States, and 2,000 billion for the world. Of the estimated 2,000 billion barrels of recoverable oil and natural-gas liquids, Dr. Weeks reported that some 100 billion barrels has been produced to date. On top of the conventional oil and natural-gas liquids reserves, Dr. Weeks added an ultimate 1,500 billion barrels of secondary recoverable oil, 1,100 billion barrels of tar-sands oil; and natural-gas reserves equivalent to 1,000 billion barrels of oil. The combined total of Dr. Weeks' figures for hydrocarbon liquids and gas amounts to the equivalent of 5,500 billion barrels of oil.

Gas Reserves: Recent estimates of ultimate natural-gas reserves indicate that approximately 7,500 trillion cubic feet of gas still is untapped throughout the world, including supplies as yet undiscovered in areas where they cannot now be readily produced and transported, according to The American Gas Assn. At current rates of consumption, this amount represents several centuries' supply. About one-fifth of the world's reserves are located within the United States.

TRANSPORTATION: Pipelines — A large amount of pipeline construction is going on around the world. Some of the major projects include:

Latin America: A major gas pipeline in Argentina from Comodoro Rivadavia to Buenos Aires is still in the bidding stage. In Mexico, a major natural-gas line from southern fields to Mexico City is under way, plus a gas line from Mexican fields along the Gulf to California—the United States end to be handled by an American company. **Europe:** The Marseilles-Strasbourg crude line is under construction. A crude line from Genoa to Switzerland, with planned extensions to Germany and possible connections with Russia's future COMECON line, the world's largest, has been approved. Two major crude lines have been completed in the north of Europe recently, both aiming at the heavy industry areas of Germany. France is extending her Lacq gas system, with concentration on the southern areas to slow further industrialization in the Paris environs. **Africa:** The Hassi-Messaoud-Bougie line is in operation, and the Edjélé-Tunisia line has also been completed. A gas line of major proportions has been completed in Algeria as well, transporting Sahara gas to Algiers and other points, with possibilities of a trans-Mediterranean line to Europe.

In the **Middle East,** Iran added a major loading line to her Kharg Island terminal in 1960. Saudi Arabia completed a line for transportation of Safaniyah crude. In the **Far East,** India is at work on a major crude line to bring oil from the north down to new refineries to be built near points of supply for major areas, including the capitol. Pakistan is adding to her Sui gas system, with extensions to Multan and other areas.

Value: Pipeline construction in the noncommunist world worth $2,969,429,000 was started in 1960, excluding local gas mains, according to a pipeline study. Breakdown of the 1960 plans for 24,595 miles of construction is 15,563 miles of gas lines valued at $1,928,429,000; 3,256 miles of products lines ($256 million); 5,776 miles of crude lines ($785 million).

Tankers: An annual study by Sun Oil Co. estimates the world tanker surplus should be around for another three years at least. Carrying capacity is still increasing faster than demand. Supply and demand will not be balanced sufficiently to strengthen foreign charters in the foreseeable future.

A record 238 tankers joined the world fleet during 1959, bringing the total to 3,276 with aggregate 62,657,800 deadweight tons. This is equal to 3,826 T-2 tankers (a ship of 16,765 dwt capable of 14.5 knots). Carrying capacity increased 12.4% due to the increased size and speed of new tankers, compared with an 11.5% growth rate in the five years preceding. From 1955 through 1959, oil-company ownership of USA-flag vessels declined to 42.2% of the total from 52.8%, while independent ownership increased to 32.5% from 25.1%. USA-government ownership rose to 25.2% from 22.1%. The number of ships increased only 4.1% in 1959, but deadweight tonnage was up 10.6% and carrying capacity was up 12.4%. These gains were less than in 1958.

WORLD—Tanker Deliveries

	1960	1961	1962	1963	Total
	(Thousand tons dw.)				
Company-owned					
20,000 tons and over	3,196	2,723	1,450	1,035	8,404
Under 20,000 tons	386	116	98	48	648
Independently-owned					
20,000 tons and over	3,604	2,400	1,879	1,673	9,556
Under 20,000 tons	619	291	288	286	1,484
Total	7,805	5,530	3,715	3,042	20,092

This table shows approximate scheduled delivery dates of tankers on order and under construction on March 31, 1960 (Source: Westinform Report).

REFINING: Worldwide capacity in refining reached 23,426,100 bbl daily in 1960, an increase of some 932,050 b/d (3.7%) over the final estimates of 1959 total capacity. Growth outside the USA, and in the Eastern Hemisphere, continued to dominate. However, the low rate of increase in comparison to the past indicated a continuing slowdown in construction, a reflection of the overall imbalance of supply over demand throughout the oil industry.

Surveys of planned expenditures for new plants or improvements of existing equipment indicated that this Eastern Hemisphere growth pattern would be maintained for some time. Eastern Hemisphere spending on current projects is about $2 billion, and that for the West about $1.5 billion.

Catalytic reforming and hydrogen processing have continued to be the center of attention in research on processes for product improvement. One more new hydrocracking process was announced during 1960—Universal Oil Products Co.'s Lomax. Refiners generally strengthened research effort on finding new uses for their existing products. Work continued on the fuel cell, on the use of fuel oil to improve steel making, and on wider applications for asphalt—in railroad construction, and in agriculture to improve soil in arid climates. Near the end of the year, reports were made on studies to find uses for butane in the desalting of sea water.

A new gasoline additive of the metal alkyl type, tetra *methyl* lead rather than tetra ethyl lead, was developed in 1960 by Socony Mobil Oil Co. It was designed particularly to improve the anti-knock performance of European automobiles using today's motor gasolines.

A number of reports by USA, Canadian, and British chemical engineers in 1960 showed that a substantial improvement in the economics of catalytic cracking can be attained by careful attention to feed preparation and to specific contaminants in the feed-stock.

Among feed-stock preparation techniques which can help are (1) the Gulf HDS process; (2) a system Humble uses which includes propane de-asphalting, hydrodesulfurization, and phenol extraction; (3) a propane de-asphalting process which utilizes rotating-disc contactors; (4) Texaco's furfural refining; and (5) phenol extraction in a centrifugal extractor.

Among feed-stock variables whose properties affect cracking operation are metal poisoning and feed-stock boiling range.

The new Lomax process developed and licensed by UOP uses a fixed bed of solid catalyst in the presence of hydrogen under pressure, and produces low olefin-content products. The light naphtha—comprising butane, pentanes, and hexanes — is composed predominantly of branched isomers. Aromatics in the charge stock can be either saturated or substantially retained, depending upon specific requirements. In the case of middle-distillate production, controlled saturation of aromatics is desirable. On the other hand, when naphtha production is maximized, operating conditions are selected so as to retain a large part of the aromatics.

The process permits conversion of light distillates to gasoline, and heavier vacuum distillates can be converted into a variety of high-quality middle-distillate fuels and/or gasoline. The middle distillates need no further refining. The heavy naphtha should be catalytically reformed, although this step may not be required if regular-grade gasoline is to be made. The process produces no catalyst deposit, a smaller amount of light gases than does catalytic cracking, and olefin-free decomposition products. It permits complete recycling of material boiling above gasoline, with no sacrifice in yield or quality.

A large variety of charge stocks can be used, including kerosines, stove oils, diesel fuels, other middle-of-the-barrel distillates, catalytic cycle oils, vacuum gas oils, coker distillates, and other distillates derived from catalytic or thermal operations.

Fuel-cell research was stepped up considerably during 1960, with work going on at Shell Research Ltd.'s Thornton laboratories in the United Kingdom; at Jersey Standard's central research facility in Linden, N. J.; at Battelle Memorial Institute in Columbus, Ohio; at Allis-Chalmers in Wisconsin; and by M. W. Kellogg in its Jersey City laboratories in a project under contract to the U. S. Navy. Progress has been, and continues to be, slow. However, the increased emphasis can be expected to lead to interesting and fruitful results in the not-too-distant future.

Studies of the use of fuel oil or other hydrocarbons such as natural gas in steel making continued during 1960, notably in France and the southwestern USA where natural gas is abundant. The fuel-oil work has been under way in a joint program by Imperial Oil Ltd. and Dominion Foundries and Steel Ltd. at Hamilton, Ontario. A substantial increase in the fuel-oil

BRITISH OXYGEN SERVES THE WORLD

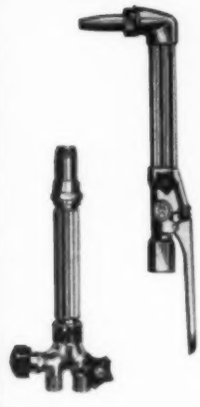
The British Oxygen Company Limited, Light Industrial Department, Spencer House, 27 St. James's Place, London, SW1. England.

PIPE CUTTING Most of the common pipe jointing preparations can be cut with B.O.C. machines. For square end and 90° branch preparations on pipes 2—12 in. diameter, there is the Alyn range of machines. In addition, B.O.C. supply a chain type Portable Pipe Cutting and Bevelling Machine to cut pipes from 4 in. diameter upwards.

ALYN MARK 2 PIPE CUTTING MACHINE Designed for speedy, accurate 90° branch or square end preparations. The Alyn Mark 2 is equally efficient on site and under workshop conditions, and needs no templates or marking-out. It is simple in design and operation—making it possible to set the machine in a few seconds. The machine is supplied for either hand or power operation and will cut pipes from 4—12 in. diameter.

Associated Companies and Official Distributors throughout the world. BOC

THE SAFFIRE COMBINED OUTFIT The Saffire Combined Outfit can be adapted for cutting, welding, heating and flame cleaning. Its extreme versatility makes it ideal for the wide range of applications found in the petroleum field. The outfit can be purchased complete or the set can be built up as required.



CUTTING The cutting attachment screws direct on to the shank, and can cut mild steel up to 2" in thickness. Preheat gases are kept separate until they reach the nozzle thus resisting backfires and confining them to the nozzle itself. A complete range of one piece mixing nozzles is available.

WELDING A complete range of swaged nozzles screws directly into the mixer enabling welds to be carried out on steel up to 1" in thickness.

HEATING The Saffire Blowpipe is adaptable to cover a wide variety of heating applications. Heating nozzles screw on to a straight welding neck or on to flexible necks which may be bent to any angle.

FLAME CLEANING Results prove that oxy-acetylene flame cleaning reduces corrosion, prolongs paint life and cuts maintenance and replacement costs for all types of steel structures. Flame cleaning attachments screw directly into the mixer and consist of a bent neck or a straight neck with a range of detachable flat nozzles or a round nozzle.

WORLD—Crude-Oil Demand and Supply in Free World, 1955 Through 1959 and Estimate for 1960
[Thousands of Barrels Per Day (TBD) Unless Otherwise Noted]

	DEMAND			SUPPLY			SOURCE OF IMPORTS															
	Runs to Stills (1)	Exports (as Shipped)	Intransit and Stock Changes	Total Demand	Indigenous Production	Imports (as Received)	Total Supply	United States		Canada and Mexico		Caribbean Area		Other Western Hemisphere		North and West Africa		Other West of Suez		Middle East		Other East of Suez		Soviet Bloc	
								TBD	% of Total Supply	TBD	% of Total Supply	TBD	% of Total Supply	TBD	% of Total Supply	TBD	% of Total Supply	TBD	% of Total Supply	TBD	% of Total Supply	TBD	% of Total Supply	TBD	% of Total Supply
								YEAR 1959 (PARTLY ESTIMATED)																	
United States	8084.5	6.9	(72.1)	8019.3	7054.0	965.3	8019.3	—	—	92.7	1.1	488.6	6.1	1.5	0.02	—	—	—	—	317.4	4.0	65.1	0.8	—	—
Canada & Mexico	996.8	91.7	(2.1)	1086.4	770.3	316.1	1086.4	1.0	0.1	—	—	208.9	19.3	—	—	—	—	—	—	105.3	9.7	—	—	—	—
Caribbean Area	1769.0	1304.2	(7.2)	3066.0	3029.8	36.2	3066.0	—	—	—	—	—	—	23.6	0.8	—	—	—	—	12.6	0.4	—	—	—	—
Other West. Hemisphere	616.6	32.7	5.3	654.6	269.8	384.8	654.6	—	—	—	—	302.5	46.2	—	—	—	—	—	—	68.4	10.4	—	—	13.9	2.1
Western Hemisphere	11466.9	1435.5	(76.1)	12826.3	11123.9	1702.4	12826.3	1.0	0.01	92.7	0.7	1000.9	7.8	25.1	0.2	—	—	—	—	503.7	3.9	65.1	0.5	13.9	0.1
Free Europe	3067.2	20.5	23.2	3110.9	265.8	2845.1	3110.9	2.4	0.07	—	—	310.2	10.0	7.0	0.2	62.5	2.0	—	—	2352.7	75.6	14.6	0.5	95.7	3.1
North & West Africa	129.7	65.0	9.9	204.6	115.0	89.6	204.6	—	—	—	—	22.7	11.1	—	—	—	—	—	—	46.2	22.6	—	—	20.7	10.1
Other West of Suez	47.3	—	0.2	47.5	2.5	45.0	47.5	—	—	—	—	2.4	5.1	—	—	—	—	—	—	42.6	89.7	—	—	—	—
Middle East	1015.2	3563.7	1.1	4580.0	4580.0	—	4580.0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Other East of Suez	1063.4	79.7	11.3	1154.4	529.4	625.0	1154.4	6.9	0.6	—	—	3.2	0.3	—	—	—	—	—	—	612.6	53.1	—	—	2.3	0.2
Eastern Hemisphere	5322.8	3728.9	45.7	9097.4	5492.7	3604.7	9097.4	9.3	0.1	—	—	338.5	3.7	7.0	0.07	62.5	0.7	—	—	3054.1	33.7	14.6	0.2	118.7	1.3
Total Free World	16789.7	5164.4	(30.4)	21923.7	16616.6	5307.1	21923.7	10.3	0.04	92.7	0.4	1339.4	6.1	32.1	0.1	62.5	0.3	—	—	3557.8	16.2	79.7	0.4	132.6	0.6
								YEAR 1960 (AS ESTIMATED AT MID-YEAR)																	
United States	8112.0	7.0	23.0	8142.0	7158.0	984.0	8142.0	—	—	118.0	1.4	492.0	6.0	—	—	2.5	0.03	—	—	312.5	3.8	59.0	0.7	—	—
Canada & Mexico	1065.0	118.0	5.0	1188.0	805.0	383.0	1188.0	1.0	0.08	—	—	242.0	20.4	—	—	—	—	—	—	140.0	11.8	—	—	—	—
Caribbean Area	1815.0	1319.0	9.0	3143.0	3103.0	40.0	3143.0	—	—	—	—	—	—	25.0	0.8	—	—	—	—	15.0	0.5	—	—	—	—
Other West. Hemisphere	647.5	30.0	5.0	682.5	325.0	357.5	682.5	—	—	—	—	270.0	39.5	—	—	—	—	—	—	62.5	9.2	—	—	25.0	3.7
Western Hemisphere	11639.5	1474.0	42.0	13155.5	11391.0	1764.5	13155.5	1.0	0.01	118.0	0.9	1004.0	7.6	25.0	0.2	2.5	0.02	—	—	530.0	4.0	59.0	0.4	25.0	0.2
Free Europe	3415.6	20.0	10.0	3445.6	289.1	3156.5	3445.6	2.0	0.06	—	—	287.0	8.3	5.0	0.1	182.5	5.3	—	—	2564.0	74.4	16.0	0.5	100.0	2.9
North & West Africa	138.0	185.0	14.0	337.0	244.0	93.0	337.0	—	—	—	—	23.0	6.8	—	—	—	—	—	—	50.0	14.8	—	—	20.0	5.9
Other West of Suez	63.0	—	2.0	65.0	2.5	62.5	65.0	—	—	—	—	2.0	3.1	—	—	—	—	—	—	60.5	93.1	—	—	—	—
Middle East	1113.0	3887.0	20.0	5020.0	5020.0	—	5020.0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Other East of Suez	1179.0	75.0	10.0	1264.0	564.5	699.5	1264.0	4.0	0.3	—	—	3.0	0.2	—	—	—	—	—	—	682.5	54.0	—	—	10.0	0.8
Eastern Hemisphere	5908.6	4167.0	56.0	10131.6	6120.1	4011.5	10131.6	6.0	0.06	—	—	315.0	3.1	5.0	0.05	182.5	1.8	—	—	3357.0	33.1	16.0	0.2	130.0	1.3
Total Free World	17548.1	5641.0	98.0	23287.1	17511.1	5776.0	23287.1	7.0	0.03	118.0	—	1319.0	0.5	30.0	0.1	185.0	0.8	—	—	3887.0	16.7	75.0	0.3	155.0	0.7

NOTES:
(1) Crude oil only.
(2) Includes Runs to Stills and/or Crude Production in Colombia, Netherlands Antilles, Trinidad and Venezuela.
(3) Includes Runs to Stills and/or Crude Production in Argentina, Bolivia, Brazil, Chile, Cuba, Ecuador, Peru, Puerto Rico and Uruguay.
(4) Includes Runs to Stills and/or Crude Production in Austria, Belgium, Denmark, Finland, France, Germany (West), Greece, Ireland (Eire), Italy and Trieste, Netherlands, Norway, Portugal, Spain, Sweden, Turkey, United Kingdom and Yugoslavia.
(5) Includes Runs to Stills and/or Crude Production in Algeria, Angola, Canary Islands, Egypt (UAR), French Equatorial Africa, Morocco and Nigeria.
(6) Includes Runs to Stills and/or Crude Production in Israel, Lebanon and Syria (UAR).
(7) Includes Runs to Stills and/or Crude Production in Aden, Bahrain, Iran, Iraq, Kuwait, Neutral Zone, Qatar and Saudi Arabia.
(8) Includes Runs to Stills and/or Crude Production in Australia, Br. Borneo, Burma, Formosa (Taiwan), India, Indonesia, Japan, New Guinea, Pakistan, Philippines, and Union of South Africa.
(9) Exports (As Shipped) from Free Europe include following volumes exported to Soviet Bloc countries: 1955—27.8 TBD, 1956—26.0 TBD, 1957—21.2 TBD, 1958—19.0 TBD, 1959—20.2 TBD, 1960—20.0 TBD.
Source: Office of Oil and Gas, Dept. of The Interior, Washington 25, D. C.

market could conceivably result from success in this project. If widely adopted in the USA alone, it could mean an estimated increase in fuel-oil sales of about 300,000 b/d.

In petrochemicals, the annual growth rate continued to exceed that of conventional refining. In the USA, petrochemicals are expected to rise at about 9% per year for the coming five years; and outside the USA will almost double that—estimates ranging from 12% to 19% annually.

Output of petrochemicals in the USA is more than 22 million metric tons per year, and they comprise about 30% by volume of all USA chemical production. In terms of money, petrochemicals currently represent 57% of the dollar value of all chemicals manufactured in the USA.

In Europe, petrochemical output rose almost 500% between 1953 and 1959. In terms of carbon content, production grew from some 208,000 metric tons in 1953 to an estimated 1,225,000 tons in 1959 (OEEC estimate). Forecasts indicate this will reach 2.4 million tons by the end of 1961. Investment in European petrochemical manufacturing had risen to some $775 million by the end of 1958, and is expected to reach $1.6 billion by the end of 1960.

Refining Surplus: The majors are also being forced into refinery construction in many areas to protect their market positions. The scope of expansion is evident from current plans for new refining capacity. In Europe, almost 600,000 b/d in new plants was to be added during 1960, with another 560,000 b/d scheduled for subsequent years. For the rest of the free world outside North America, plans called for another 300,000 b/d of new capacity in 1960; over one million b/d thereafter.

MARKETING: Focus of the international industry is on markets at the present. Many exploration arrangements are made more to secure a market for possible production than through belief in the geology. A number of estimates have been made of the future use of oil. Three of them were presented at the Fifth World Petroleum Congress. Of the three, that by Levy and Lipton has been chosen here as the median and probably the closest to correct. All three estimates, however, are very close. The following review is taken in part from a speech by Walter J. Levy, an outstanding consultant on economic matters.

Oil Requirements of the Free World: Oil demand of the free world will increase to about 32 million b/d by 1970. Despite rapid and continued progress, however, the 1970 per-capita consumption of energy in Europe will still be only one-third of that of North America; that of Latin America, one-eighth; and that of other Eastern Hemisphere countries, one-twentieth.

North America: Estimates show an increase in daily oil consumption between 1960 and 1970 from 10.8 million to 15.0 million barrels, a rate of about 3.4% a year as compared with nearly 4.6% in the previous 10 years.

Western Europe: A more rapid expansion in oil requirements is indicated. European energy consumption is at a stage of development roughly comparable to that of North America between 1900 and 1929 and, accordingly, per-capita energy consumption will grow by about 2.2%. For the near-term, it would appear the bulk of the increase in Europe's energy demand will have to be filled by imported oil. We have

THE TWO OUTSTANDING

PLATINUM REFORMING CATALYSTS

ENGELHARD
INDUSTRIES, INC.
CHEMICAL DIVISION
113 ASTOR STREET • NEWARK 2, NEW JERSEY

IMPORTANT NOTICE:

These two well established platinum reforming catalysts having distinctive product distribution patterns are now manufactured by Engelhard and supplied under a single license and catalyst supply contract. This new, singular service advantage allows you to choose the catalyst best suited to particular processing or economic conditions in a given installation. Greater latitude in reforming results thus assures maximum economy in each individual refining operation.

Investigate the unique performance of these outstanding platinum reforming catalysts. They provide longest periods of operation – *regeneration in situ!* They deliver important yield increases at high octane levels – *in existing equipment!* They reduce costs sharply–*to lowest level!*

An Engelhard representative will be glad to give you detailed information upon request. ★ ★ ★

PROMPT PRECIOUS METAL SCRAP RECOVERY SERVICE • ENGELHARD PROCEDURES RECOVER 100% OF ASSAYED PRECIOUS METAL CONTENT • IRVINGTON-BAKER REFINING DIVISION

WORLD—Crude Prices at January 1, 1961
(U. S.—$ Per Barrel)

NORTH AMERICA (posted on field):	A.P.I. Grav.	U.S. $
Oklahoma, Kansas	36.0-36.9°	2.97
E. Texas	Flat	3.25
W. Texas-Sour	29.0-29.9°	2.62
Bradford, Penn.	Flat	4.80
Signal Hill, Cal.	27.0-27.9°	2.74
Kettleman Hills, Cal.	37.0-37.9°	3.21
Redwater, Alberta, Canada	Flat	2.42
VENEZUELA Export Prices (Creole) per barrel: Published by Creole Petroleum Corporation		
Cunarebo (o)	47.0-47.9°	3.34
Mulata (i)	37.0-37.9°	2.84
Tia Juana-Light (i)	31.0-31.9°	2.55
Tia Juana-Med. (i) (u)	26.0-26.9°	2.30
Pedernales (l)	21.0-21.4°	1.90
Temblador (i)	20.5-20.9°	2.15
Tia Juana Heavy (q)	approx. 18°	1.90
Quiriquire (i)	approx. 16°	2.10
Bachaquero (q)	approx. 16°	1.85
MIDDLE EAST AND MED. Export prices in U.S. $ per barrel f.o.b. excluding local port or govt. charges:		
Arabia, ex Sidon	34.0-34.9°	2.17
Arabia, ex Ras Tanura	34.0-34.9°	1.80
Qatar, ex Umm Said	41.0-41.9°	1.95
Iraq-Basrah, ex Fao	35.0-35.9°	1.72
Kuwait, ex Mena al Ahmadi	31.0-31.9°	1.59
Iran Light, ex Abadan	34.0-34.9°	1.73
Iran Heavy/Med., ex Abadan	31.0-31.9°	1.58
Iran Gach Saran, ex Kharg Is.	31.0-31.9°	1.63
FAR EAST: Export prices excluding local or other Government charges and/or taxes: Seria, ex Lutong, Sarawak app. 36° API, Sarawak Shell Oilfields Ltd., effective 6-9-60, U.S. $2.42 per barrel.		

WORLD—10-Year Oil Investment in Free World

Year	United States	Other Countries	Free World	United States	Other Countries
		Million Dollars		Percent of Free World	
1950	2.925	1.500	4.425	66.1	33.9
1951	3.625	1.700	5.325	68.1	31.9
1952	4.400	2.350	6.750	65.2	34.8
1953	5.025	2.550	7.575	66.3	33.7
1954	5.350	2.725	8.075	66.3	33.7
1955	5.600	2.950	8.550	65.5	34.5
1956	6.050	3.975	10.025	60.3	39.7
1957	6.400	5.000	11.400	56.1	43.9
1958	5.300	5.400	10.700	49.5	50.5
1959	5.425	5.775	11.200	48.4	51.6
Total	50.100	33.925	84.025	59.6	40.4

WORLD—Distribution of Oil Investment by Departments and Areas, 1959

Department	United States	Other Countries	Free World	United States	Other Countries
		Million Dollars		Percent of Total	
Production	4.000	2.030	6.030	73.7	35.2
Pipelines	135	440	575	2.5	7.6
Tankers & Other Marine Equipment	125	1.280	1.405	2.3	22.2
Refineries	350	850	1.200	6.5	14.7
Chemical Plants	175	170	345	3.2	2.9
Marketing	450	885	1.335	8.3	15.3
Others	190	120	310	3.5	2.1
Total	5.425	5.775	11.200	100.0	100.0

thus projected an increase in oil demand from 3.9 million b/d in 1960 to 7.2 million b/d by 1970.

Underdeveloped Areas: In Latin America, Africa, and Asia, energy use is at such low levels that per-capita energy consumption now is only at about a tenth of what it was in North America in 1900. Projected growth in per-capita energy consumption is about 4.4% per annum, the rate which obtained in North America from 1900-13. The rates of growth implied by projections between 1960 and 1970 are 8.3% a year in Latin America, whose consumption will advance to 3.7 million b/d from 1.7 million b/d, and 8.7% per annum in Asia, Africa, and Oceania, where demand will advance to 5.8 million b/d from 2.5 million b/d.

International Markets: Development of new producing fields, and by new producing companies, and increased producibility in present export areas all suggest that the crude-oil surplus will persist well into the '60's. At the same time, surplus refining and tanker capacity is also likely to continue. In consequence, market competition will become increasingly intense; both crude and product prices will be under pressure; and the margin of profitability is apt to narrow.

New Producing Areas: New producing areas are now at the point of large-scale development, most spectacularly in North Africa. The implications of expanded Sahara production mean an increasing displacement of Middle East and some Venezuelan crude. Meanwhile, each company would want its Sahara liftings to include as much of its own Sahara or other French-origin crude as possible. This could result in added impetus for a more rapid Sahara development by individual companies in order to protect their competitive position.

Libya already promises to become a major producing region in the near future. Libyan crude has four distinct advantages. From all indications, it will be low-cost oil, at least for those companies fortunate enough to hold favorable concessions. By virtue of location, it can also command a price premium over Middle East crude. For most of the concession holders, it further represents control over substantial reserves which can be drawn upon freely without risking overlifting which may be involved in joint concessions in the Middle East. Finally, the Libyan legal and tax system is comparatively attractive.

The price of Libyan crude may actually be established below the point of competitive equalization with Middle East crudes. This would place Middle East oil at a disadvantage, and could lead to crude price adjustments there. In this event, Middle East producing profits would be generally reduced. The resulting reduction in the income of Middle East governments might lead to requests for higher taxes, similar perhaps to those in Venezuela. This would further affect the profit rate of the companies on Middle East production.

Any reduction in Middle East crude prices will add to the competitive disadvantage of Venezuelan crude. Significantly, the Venezuelan government is actively pressing for international prorationing among major producing countries; and has repeatedly stressed it is more concerned with maintaining the price of its oil than with expanding production.

Demand in 1960: World demand for petroleum is estimated to have risen 1,377,600 b/d in 1960, to a level of 21,682,500 bbl daily. This 6.8% increase compares with a growth in demand of 6.9%, or 1,316,000 b/d, in 1959 and with 5.1%, or 985,000 b/d, in 1958.

The Eastern Hemisphere continues to rise at a more rapid rate than the Western. The anticipated increase in demand of 10.1% in 1960 for the eastern half of the world is more than double the 4.4% in the West. Although the Eastern Hemisphere rise is from a smaller base, the differential grows less every year. For example, in 1960, 43.5% of total world demand for petroleum was in the Eastern Hemisphere. In 1959, it was 41.2%, and in 1949 it was 29.5%.

Latin America and Canada increased consumption at greater rates than the United States within the Western Hemisphere. With Argentina, Brazil, and Chile continuing to show strong growth rates, the countries of Latin America maintained the 7.3% demand rise they indicated in 1959. Canada showed a 4.9% increase, while the USA rose only 3.8%, less than it rose in 1959. Continental USA demand fell short of 10 million barrels daily in 1960, having been projected at 9,796,000 b/d.

The Eastern Hemisphere was highlighted by rather healthy increases in growth rates in the Far East and Africa, a moderate increase in rate in the Middle East, and a continued strong rise in Europe.

Western Europe demand reached 3.7 million b/d, an increase of about 316,000 b/d, or 9.4%, while communist nations expected a rise of some 11%, to 3 million b/d demand in 1960.

Indications are strong that the United Kingdom during 1960 replaced Canada as the third largest consuming country, after the USA and the Soviet Bloc, with its projected demand level for the year of 864,000 b/d. Fuel-oil consumption continues to be the dominant factor in this UK rise.

Largest increase in demand in Europe is estimated for Germany, 18%, or about 85,500 b/d, to 620,000 b/d in 1960. Germany, therefore, replaced France as the largest consumer in continental Europe. French demand rose about 9%, to 541,400 b/d.

East of Europe, the demand situation is dominated by the very great growth in Japan, where consumption in 1960 is estimated to have reached 503,200 b/d, for a rise of 35.6%. Largely because of this, but also due to very healthy increases in Australia, the Philippines, India, Indonesia, and Thailand, the Far Eastern section of the world showed an expected 13.7% increase in demand.

OIL LAWS

During 1960, major revisions of oil laws occurred in the **Western Hemisphere:** in the United States, Canada, and Cuba; in **Africa:** in northern Algeria (not the OCRS area), and Nigeria; in the **Far East:** in Burma and Indo-

World Functional Division of Major Petroleum Data — Year 1960

Country	Production			Proved Reserves		Refining (As of July 15, 1960)				1963 (Forecast)	Consumption (Crude-Equivalent Basis) (Thousands of Barrels Per Day)	
	Barrels Per Day	Metric Tons Per Year (000's)	Conversion Factor	Millions of Barrels	Millions of Metric Tons	No. of Plants	Crude Capacity Thousands of Barrels Per Day	Thousands of Metric Tons Per Year	Catalytic Cracking Capacity (Thousands of B/D)	Crude Capacity (Thousands of B/D)	1960 (Preliminary)	1961 (Estimate)
Aden	—	—	—	—	—	1	120.0	17.1	—	120.0	—	—
Albania	11,000	603	6.672	700	105.0		(In USSR)					
Algeria (OCRS)	170,078	8,100	7.685	2,900	377.4	—	—	—	—	44.0	40.	42.
Angola	1,300	69	6.882	25	3.6	1	3.0	0.4	—	3.0	—	—
Argentina	172,603	8,998	7.021	1,500	213.6	16	279.6	39.9	32.0	363.3	270.	291.
Australia	—	—	—	—	—	7	244.0	34.9	77.0	288.0	225.	238.
Austria	45,409	2,442	6.788	247	36.4	6	31.8	4.5	—	64.4	58.	62.
Bahrain	45,076	2,249	7.335	220	30.0	1	186.5	26.6	27.3	186.5	—	—
Belgium & Luxembourg	—	—	—	—	—	7	165.2	23.6	26.1	255.2	160.	168.
Bolivia	10,215	519	7.205	76	10.5	4	11.9	1.7	—	11.9	5.	6.
Brazil	82,713	4,138	7.315	617	84.3	8	180.8	25.8	49.0	336.3	278.	299.
British Borneo	96,100	4,670	7.531	500	66.4	1	46.0	6.6	—	46.0	—	—
Bulgaria	3,742	189	7.265	16.7	2.3		(In USSR)					
Burma	10,900	534	7.464	45	6.0	3	8.0	1.0	—	8.0	—	—
Canada	522,000	25,721	7.428	3,800	511.6	42	945.1	135.0	287.2	976.1	866.	917.
Chile	19,800	937	7.735	90	11.6	3	47.2	6.7	12.0	47.2	49.	51.
China (Communist)	100,000	5,037	7.266	1,400	192.7		(In USSR)					
Colombia	155,000	8,078	7.023	700	99.7	5	71.4	10.2	28.1	71.4	65.	71.
Cuba	200	12	6.652	1.8	0.3	8	86.6	12.4	14.6	104.6	91.	96.
Czechoslovakia	2,416	130	6.782	13	1.9	—	—	—	—	—	—	—
Denmark	—	—	—	—	—	3	0.6	0.1	—	20.6	102.	109.
Ecuador	7,600	364	7.651	24	3.1	3	16.0	2.3	—	24.0	12.	13.
Egypt	62,100	3,255	6.952	500	71.9	3	85.0	12.1	—	127.0	97.	100.
Eire (Ireland)	—	—	—	—	—	1	41.7	6.0	—	41.7	—	—
Finland	—	—	—	—	—	2	42.2	6.0	14.3	42.2	48.	42.
France	36,978	1,999	6.77	174	25.7	15	831.7	118.8	105.5	971.7	540.	580.
Gabon (and Middle Congo)	18,500	1,000	6.77	56	8.3	—	—	—	—	—	—	—
Germany (West)	107,262	5,507	7.129	520	72.9	23	601.5	85.9	64.7	914.0	647.	725.
Germany (East)	1,700	97	7.129	N.A.	N.A.		(In USSR)					
Greece	—	—	—	—	—	3	67.0	9.6	—	73.0	46.	49.
Hawaii (Incl. Alaska)	(In USA)	—	—	—	—		(In USA)					
Hong Kong & Macao	—	—	—	—	—	—	—	—	—	—	22.	24.
Hungary	24,000	1,200	7.630	200	26.2		(In USSR)					
India	8,500	417	7.464	300	40.2	4	144.0	20.6	28.3	200.0	155.	165.
Indonesia	393,235	19,486	7.386	9,000	1,218.5	6	273.8	39.1	10.0	273.8	101.	107.
Iran	1,054,650	51,766	7.428	40,000	5,385.0	4	437.6	62.5	35.0	443.6	140.	150.
Iraq	963,745	47,296	7.458	25,000	3,352.1	6	62.1	8.9	—	71.9	40.	43.
Israel	2,600	131	7.286	15	2.1	1	75.0	10.7	—	75.0	40.	43.
Italy (and Sicily)	38,100	2,062	6.7262	300	44.6	39	780.5	111.5	45.8	983.0	460.	510.
Japan	7,900	433	6.679	50	7.5	25	609.5	87.1	54.6	839.5	585.	700.
Kuwait	1,623,711	81,654	7.278	58,000	7,969.2	1	171.0	24.5	—	171.0	63.	66.
Lebanon	—	—	—	—	—	2	23.7	3.4	—	23.7	18.	18.
Libya	—	—	—	2,000	—	0	0	—	—	4.0	4.	4.
Mexico	271,247	13,975	7.104	4,348	612.0	8	399.0	57.0	60.0	519.0	338.	362.
Morocco	1,800	88	7.466	9.5	1.3	1	2.4	0.3	3.5	27.4	20.	21.
Netherlands, The	36,000	1,893	6.959	250	35.9	2	359.	51.3	77.0	495.0	255.	280.
Netherlands West Indies			6.959			2	650.0	92.9	80.0	650.0	142.	144.
Neutral Zone	136,000	7,184	6.929			2	80.0	11.4	—	80.0	—	—
New Guinea (Western)	4,500	221	7.468	25	3.3	—	—	—	—	—	—	—
New Zealand	—	—	—	Nil	Nil	0	0	0	—	40.0	40.	42.
Nigeria	17,350	878	7.233	100	13.8	0	0	0	—	N.A.	—	—
Norway	—	—	—	—	—	1	2.3	0.3	—	82.3	70.	75.
Pakistan	6,914	337	7.506	25	3.3	1	5.0	0.7	—	37.0	45.	47.
Paraguay	—	—	—	—	—	0	—	—	—	—	2.	2.
Peru	52,100	2,537	7.517	326	43.4	3	47.6	6.8	—	47.6	52.	56.
Philippines	—	—	—	N.A.	N.A.	2	47.0	6.7	11.9	82.0	55.	62.
Poland	3,864	193	7.419	25	3.3		(In USSR)					
Portugal & Islands	—	—	—	—	—	1	21.6	3.1	9.5	27.0	36.	39.
Puerto Rico	—	—	—	—	—	2	90.0	12.9	62.1	90.0	49.	52.
Qatar	172,924	8,208	7.711	2,500	324.2	1	0.6	0.1	—	1.8	—	—
Romania	231,300	11,565	7.453	1,000	134.0		(In USSR)					
Saudi Arabia	1,247,140	61,600	7.410	38,600	5,209.2	1	189.0	27.0	—	209.0	73.	77.
South Africa	—	—	—	—	—	2	27.5	3.9	10.0	89.5	—	—
Spain	—	—	—	—	—	3	140.7	20.1	—	162.7	118.	113.
Sudan	—	—	—	—	—	—	—	—	—	—	—	—
Sweden	—	—	—	—	—	5	63.6	9.1	—	64.8	242.	248.
Switzerland	—	—	—	—	—	—	0	—	—	40.0	80.	84.
Syria	—	—	—	105	14.0	1	20.0	2.9	—	20.0	19.	22.
Taiwan (Formosa)	39	Nil	7.610	0.5	Nil	1	35.0	5.0	10.0	35.0	—	—
Thailand (Siam)	300	Nil		N.A.	N.A.	1	1.	0.1	—	34.0	24.	25.
Trinidad	115,000	6,100	6.900	425	61.6	3	192.0	27.4	28.0	304.0	48.	49.
Trucial Coast				250	Nil	—	—	—	—	—	—	—
Tunisia	—	—	—	—	—	—	—	—	—	—	10.	10.
Turkey	7,016	380	6.750	75	11.1	1	7.0	1.0	3.0	117.9	38.	42.
United Kingdom	1,740	85	7.499	6	0.8	16	997.3	142.5	125.4	997.3	950.	1,030.
USSR	2,960,000	148,000	7.266	23,500	3,235.0	N.A.	2,648.0	378.3	N.A.	3,957.0	2,920.	3,205.
United States	7,017,000	346,215	7.418	33,500	4,516.0	293	9,735.0	1,390.7	3,639.0	10,500.0	9,650.	9,845.
Uruguay	—	—	—	—	—	1	42.0	6.0	1.5	56.0	29.	30.
Venezuela	2,846,100	149,365	6.974	18,500	2,652.7	11	932.5	133.2	44.7	977.5	166.	175.
Yugoslavia	24,000	1,242	7.070	140	19.8		(In USSR)					
WORLD TOTAL	20,951,467	1,049,159		272,700.5	36,875.3	619	23,305.1	3,346.2	5,077.1	27,962.4	21,786.	22,917.

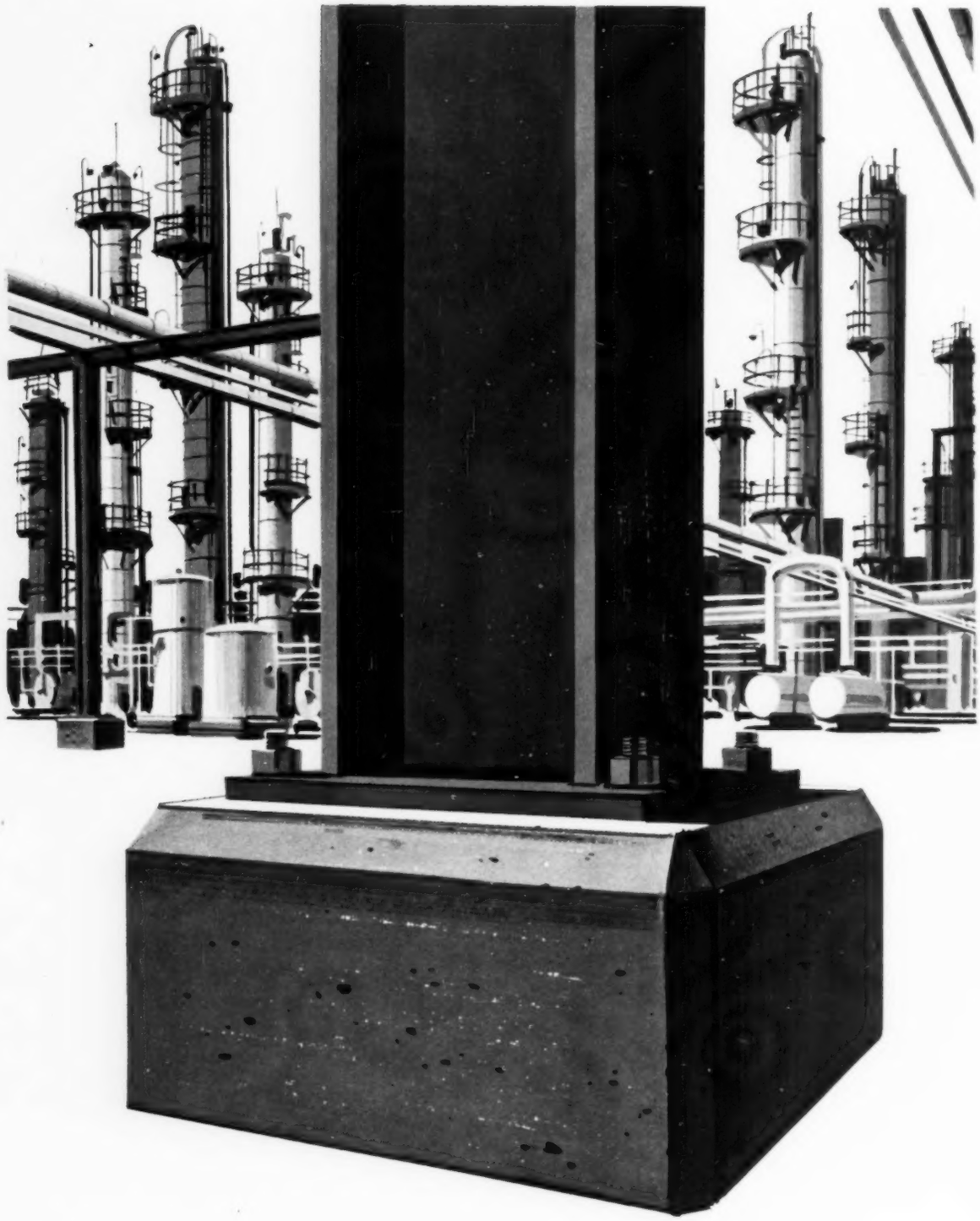
PRODUCTION: Tabulation includes all countries which have any significant production of crude petroleum. Figures given in U.S. barrels of 42 gallons; for conversion to total barrels, multiply by 365. For rough conversion to total metric tons produced during the entire year, multiply by 50. Those countries which do not show any production did not produce oil in 1958; they are included only because they have refining facilities.

CONVERSION FACTOR: These factors have been used to convert the barrel figures to metric tons. They represent the number of barrels contained in each metric ton, and were supplied by the U.S. Bureau of Mines.

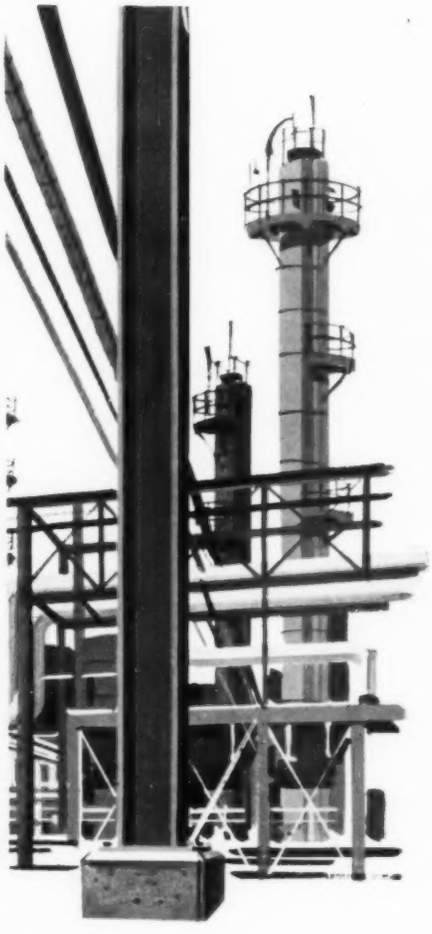
RESERVES: Figures are for proved recoverable reserves, as of January 1, 1961, or as close thereto as possible. For exact dating of reserve figure, see the appropriate country section.

REFINING: Refinery data were compiled in mid-1960 but corrected to year's end. For more details on plants, see the appropriate country section. USSR data are estimated, as are data on other communist nations. Capacities given are in barrels per calendar day. For persons not familiar with refinery processes, the crude capacity represents the amount of crude which can be run through the refinery; the cracking capacity should not be added to it to obtain total capacity.

CONSUMPTION: Note that consumption figures do not total up because **not all** countries of the world are included seperately in the list; only the major oil users or those that have production or refining facilities. The World Total for oil use, however, includes **all** countries of the world, plus military liftings for the world as a whole, and represents entire world use. As concerns the use of crude equivalent, it is a device used to most closely represent the total use of crude petroleum. The same system is used for all countries to arrive at their crude equivalent figure, but different countries require different applications of it. For example, in the case of a country which has no refining, the crude-equivalent figure is imports of products with no change (except, to put the figures on the same basis for processing by IBM machine, the marketing allowance is added and subtracted after processing). In the case of a country having internal refining, the crude-equivalent figure is actual consumption as derived from sales reports, to which is added 7% of refinery runs consumed within the country. This 7% allowance is for refinery losses, etc. In addition, the sales figure is increased by 1% for all products except fuel-oil sales, and by 9% for fuel-oil sales. This is a marketing allowance for losses during sales. The world total, generally speaking, on a crude equivalent basis is 7% higher than actual consumption of products, since practically all products must be refined before they are consumed. NA—Not available.



Foster Wheeler *Heat Engineered* **products, plants and processes . . . for the world's industrial progress.**



Best foundation for process profitability

What is the best insurance that your new process plant will produce "as planned"?

When Foster Wheeler is your "planner" there is experience with the design, construction and start-up of 75 different processes—in more than 800 plants throughout the world—to provide a sound basis for every detail.

This experience covers every conceivable operating condition: temperatures, pressures, corrosion, erosion and others. The problems of equipment design and world-wide procurement have been met and solved, over and over again.

When Foster Wheeler designs, engineers and constructs your process plant, *experience* is the foundation for process profitability.

FOSTER FW WHEELER

NEW YORK LONDON PARIS ST. CATHARINES, ONT.

nesia. No major changes occurred in Europe. For details on each of these changes, see the appropriate country section in this report.

Several publications have appeared which are unique in the field of international petroleum legislation. The established legislative reference service, *Petroleum Legislation*, expanded its excellent coverage of the world to a total of about 70 countries. New additions include Burma, Japan, Indonesia, Qatar, and about a dozen other countries. The Qatar section is particularly interesting, since this is the first time any authoritative summary has been released in detail on the concession arrangements there. The Burmese and Indonesian reviews are also of great interest. *Petroleum Legislation* contains summaries and analyses of the petroleum legislation and/or concession contracts for most countries of petroliferous interest. They have been prepared by law firms within the country concerned, which firms have been recommended by oil companies actually operating there. The summaries vary in scope, but are generally accurate and concise. For information concerning this highly recommended service, inquiries should be addressed directly to the publisher, *Petroleum Legislation Ltd., P. O. Box 1591, Grand Central Station, New York 17, N. Y., USA.*

The same publisher, Petroleum Legislation Ltd., also in 1960 completed *"Basic Oil Laws,"* a series of books on the world oil industry. There are seven in this series, each devoted to a geographical area and containing translations of the oil laws and concession contracts within that area. They differ from the reference service of *Petroleum Legislation* mentioned immediately above in that they are word-for-word translations, checked by oil companies within the country concerned. The original volumes (there are about 15 in all) are kept up-to-date by bound supplements to the originals, which supplements contain later laws or contracts. One work in the series is *"Middle East—Basic Oil Laws and Concession Contracts."* In two volumes, it contains the original of the Aramco concession, the Pacific Western Oil Co. concession for the Neutral Zone (now known as Getty Oil Co.), etc. Other series are headed by the area concerned, followed by the same title *"Basic Oil Laws and Concession Contracts."* These other areas include *Europe, South America, North America, Central America and Caribbean, Asia and Australasia, Central and South Africa, and North Africa.* Copies of these are available through *World Petroleum Report*, but those interested are urged to address their inquiries directly to the publisher, *Petroleum Legislation Ltd., P. O. Box 1591, Grand Central Station, New York 17, N. Y., USA.*

NATIONAL FACTORS

Governmental control over the oil industry was extended during 1960 in several important areas. In Libya, rising nationalism has erected a cloud of red tape which is delaying operations considerably, and promises to delay them still further. In Europe, France took steps to enlarge her national oil company, UGP, at the expense of small distributors. The Venezuelan government appeared determined to restrict production and price cuts by companies there. In Canada, a substantial tax hike cooled the ardor of international capital toward investment in an area already extremely high-cost.

The same extension of governmental authority is evident in other areas. Peru is one, where a bill was introduced to gradually nationalize the only large oil company. Brazil is another, where a bill now under consideration would monopolize marketing and refining, as well as production and exploration which are already under government monopoly. Indonesia and Burma led the way in the Far East with restrictive new laws.

An outstanding new publication appeared at the end of 1960, scheduled for general distribution during 1961. Title is *"International Taxation Services."* It contains a review of taxation of petroleum in every major country of the world. Each country's review extends through exploration, production, refining, and marketing. Citations of applicable laws are given throughout, and tax rates are defined. A good deal of practical experience has gone into its compilation by oil taxation experts in each country concerned. For example of the series, see the Colombia section of this report, i.e., the part entitled *"Colombia—Petroleum Industry Taxation."* For information, inquiries should be sent directly to the publisher, *International Taxation Series, P. O. Box 2744, Grand Central Station, New York 17, N. Y.*

Capital Investment in Oil: The best single source on the expenditures and investment by the oil industry during recent years in The Chase Manhattan Bank, located in the city of New York. There follows a summary of the bank's October 1960 report, covering the industry's expenditures in 1959. Data for 1960 will not be available until late in 1961.

Highlights: Crude-oil production, refinery throughput, and petroleum consumption in the free world increased twofold between 1949 and 1959, while gross investment in fixed assets expanded 2.8 times.

During this period, the industry carried on a program for replacing and expanding facilities which entailed worldwide expenditures of $84 billion. Of these funds, about $50 billion, or 60%, went for properties and plants in the United States, and $34 billion, or 40%, for facilities in other areas.

Expenditures by departments of the business were distributed as follows: production, 58%; transportation, 14%; refineries and chemical plants, 16%; and marketing and other facilities, 12%.

As a result of the funds disbursed during this decade, the gross investment in fixed assets employed by the industry grew from $34.6 billion at the end of 1949 to $97.3 billion at the close of 1959. Of the latter amount, $54.7 billion, or 56%, was located in the United States and $42.6 billion, or 44%, abroad.

Gross investment at December 31, 1959, by departments of the business were as follows: production, 48%; transportation, 17%; refineries and chemical plants, 19%; and marketing and other facilities, 16%.

Of the total investment of $42.6 billion in fixed assets located outside of the United States, American oil companies contributed $16 billion, or 38%. Allocation of their participation by areas follows: Canada 59%; Venezuela 64%; Western Europe 24%; Middle East 47%; and other countries 27%.

The share of American enterprises in free foreign crude-oil operations for 1959 was 55% of production and 42% of refinery runs.

WORLD—Distribution Outside USA of 10-Year Expenditures for Crude Oil and Natural Gas

	Million Dollars	Percent of Total
Canada	3,775	24.5
Venezuela	4,180*	27.1
Europe & Africa	2,445	15.9
Middle East	1,720	11.2
Far East	1,150	7.5
Other Countries	2,120	13.8
Total	15,390	100.0

*Includes $700 million for concession acquisitions in 1956-1957.

Capital Expenditures: During the 10-year period 1950-59, the outlay for replacement and expansion of property, plant, and equipment by the free world petroleum industry aggregated $84 billion, of which $50 billion, or 60%, was made in the United States. The funds invested each year are given in an accompanying table.

Distribution of the outlay by departments and areas of the business for 1959 also is set out in an accompanying table.

The data in the two tables referred to include the cost of drilling dry holes and lease-concession acquisitions, but exclude geological and geophysical expenses and lease rentals amounting to $5.7 billion in the United States and $2.6 billion in other countries for the years 1950-59.

Cost of Expanding Crude Production: The petroleum industry requires substantial funds for finding and developing crude-oil and natural-gas reserves. These expenditures during the years 1950-59 totaled $56 billion, of which 73% was spent in the United States and 27% abroad, as summarized in an accompanying table.

The combined figure of $56 billion includes the cost of drilling dry holes and lease-concession acquisition, geological and geophysical work, and lease rentals. Expenditures for the latter two items represent 14% of the total cost in the United States and 17% abroad.

Distribution of this outlay by areas outside the United States for the 10-year period is also shown in an accompanying table.

The trend in unit costs of maintaining and expanding crude production in the United States compared with other areas for the years 1950-59 is also shown in an accompanying table.

These calculations are significant and valuable because they (1) can be compiled from available information, (2) are not dependent on estimates of new reserves added each year, and (3) measure with some degree of accuracy the trend in costs of expanding production. It should be understood that this computation does not give credit for natural gas and natural-gas liquids produced. The revenue derived therefrom in the United States is very substantial, and is becoming more important in other areas.

Investment in Fixed Assets: The investment in property, plant, and equipment represents the cumulation of capitalized expenditures for various facilities after deducting retirements. The estimated gross fixed assets employed by the free-world petroleum industry amounted to $97 billion at the end of 1959, of which 56% was located in the United States and 44% in other areas. A functional breakdown of the gross and net carrying values at December 31, 1959, is presented in an accompanying table.

END

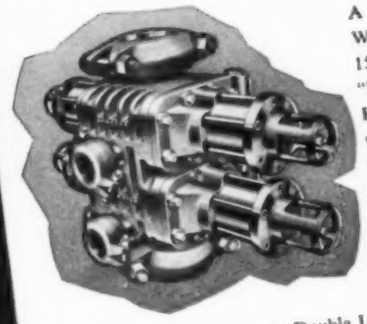
LATEST SHAFFER "LWS" ADVANCEMENTS MARK NEW ERA IN BLOWOUT PREVENTERS

With modern drilling programs constantly probing into more and more remote areas of the globe, it was inevitable that blowout preventer equipment would *eventually* become lighter in weight, easier to handle and transport—*without sacrificing pressure handling abilities or basic operating features.*

Shaffer, pioneer in pressure-control equipment, recognized this need several years ago and initiated a major research and development program in lightweight control gate designs. This program led to development of the initial Shaffer "LWS" Preventers—units that offered adequate pressure protection for production and re-work applications, yet weighed approximately one-half as much as comparable equipment then available.

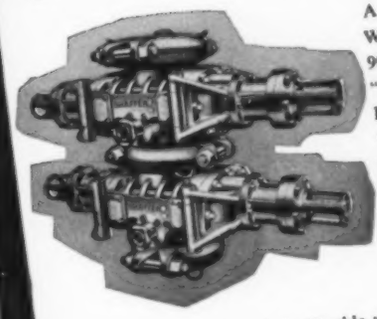
Now Shaffer has taken another major step ahead of the field with announcement of these two additional "LWS" Preventers having even higher pressure ranges than the original "LWS" units, coupled with important savings in weight that assure lower transportation costs and greater handling ease . . .

6"—5,000# W.P.



A new 6"—5,000# W.P. (6" Series 1500) Shaffer Type "LWS" Hydraulic Blowout Preventer with a *Working* Pressure of 5,000 PSI (*Test* Pressure of 10,000 PSI) and a 7-1/16" Bore. This unit is available in both *Single* and *Double* designs—and the Double Unit has a total weight of only 2,610 lbs. (as compared with the 5,700 lb. weight of comparable equipment heretofore available). *That's a saving of 55% in weight—with no sacrifice in operating features!*

10"—3,000# W.P.



A new 10"—3,000# W.P. (10" Series 900) Shaffer Type "LWS" Hydraulic Blowout Preventer with a *Working* Pressure of 3,000 PSI (*Test* Pressure of 6,000 PSI) and an 11" Bore. This unit, also, is available in both *Single* and *Double* designs—and the Double unit has a total weight of only 3,850 lbs. (as compared with the 6,965 lb. weight of comparable equipment heretofore available). *That's a saving of 45% in weight!*

All the above "LWS" Preventers incorporate the latest Shaffer advancements . . . **Swinging END-Opening Doors** for quick, simple ram changes without loss of operating fluid—**Positive Direct Hydraulic Drive** with each ram on the same shaft as the operating piston (no levers, yokes or other complex connections) . . . **Quick-Drain Ram Compartments** that prevent detrimental accumulation of mud and sand—*and many other unique advancements found only in Shaffer Preventers.*

Whether your operations are in remote areas where transportation is a problem, or in domestic fields where the easier installation and handling advantages of lightweight equipment are important, it will pay you to investigate Shaffer Type "LWS" Gates for *your* operations. See your nearby Shaffer representative for complete details —or write direct!

SPECIFICATIONS ON POPULAR SIZES OF SHAFFER TYPE "LWS" BLOWOUT PREVENTERS

Nominal API Size	Working Pressure	Test Pressure	Vertical Bore	Approx. Weights		Approx. Saving in Weight*
				Single	Double	
6"—3,000 # W.P. (6" Series 900)	3,000 PSI	6,000 PSI	7 1/16"	780 lbs.	1,420 lbs.	67 %
6"—5,000# W.P. (6" Series 1500)	5,000 PSI	10,000 PSI	7 1/16"	1,410 lbs.	2,610 lbs.	55 %
8"—3,000# W.P. (8" Series 900)	3,000 PSI	6,000 PSI	9"	1,100 lbs.	1,950 lbs.	64 %
10"—3,000# W.P. (10" Series 900)	3,000 PSI	6,000 PSI	11"	2,100 lbs.	3,850 lbs.	45 %

***As compared with comparable equipment now in use.**

Write Shaffer Tool Works for information on larger bore sizes.

37 years OF BIG TOOL LEADERSHIP

SHAFFER

HIGH PRESSURE DRILLING AND CONTROL EQUIPMENT • FISHING TOOLS THAT EXCEL

CALIFORNIA SERVICE SHOPS: Santa Fe Springs, Santa Maria, Ventura, Avenal, Bakersfield and Taft
HOUSTON, TEXAS 6606 Rankin Road • ODESSA, TEXAS 1925 West Second Street
OKLAHOMA CITY, OKLAHOMA Shaffer Tool Works, 6701 South Shartel Boulevard
FARMINGTON, NEW MEXICO Shaffer Tool Works, Post Office Box 349
CASPER, WYOMING Shaffer Tool Works, Post Office Box 1788
HOUMA, LOUISIANA Shaffer Tool Works, Post Office Box 827
EXPORT SALES OFFICE Shaffer Tool Works 500 Fifth Avenue, New York, N.Y., U.S.A.
IN CANADA Shaffer Western Hemisphere, Inc. 1823-103A Street, Edmonton, Alberta

WORLD PETROLEUM
refineries – producing fields – pipelines

OIL FIELDS
GAS FIELDS
OIL PIPE LINES
GAS PIPE LINES
PRODUCTS PIPE LINES

WESTERN HEMISPHERE

REFINING CAPACITIES

8	9
320	400

UPPER FIGURE IS NUMBER OF OPERATING REFINERIES
LOWER FIGURE IS OPERATING CRUDE CAPACITY IN 1,000 B/D

FIGURES AT LEFT ARE AS OF JANUARY 1, 1961
FIGURES AT RIGHT ARE AS OF JANUARY 1, 1963

PUBLISHED BY GEO. F. KELLY TULSA, OKLAHOMA
P.O. BOX 1773 PHONE LUther 4-5286

WORLD PETROLEUM
refineries – producing fields – pipelines

OIL FIELDS
GAS FIELDS
OIL PIPE LINES
GAS PIPE LINES
PRODUCTS PIPE LINES

EASTERN HEMISPHERE

REFINING CAPACITIES

8	9
320	400

UPPER FIGURE IS NUMBER OF OPERATING REFINERIES
LOWER FIGURE IS OPERATING CRUDE CAPACITY IN 1,000 B/D

FIGURES AT LEFT ARE AS OF JANUARY 1, 1961
FIGURES AT RIGHT ARE AS OF JANUARY 1, 1963

EFFICIENT DESALTING is the first step towards PROFITABLE REFINING

Salt removal is now a routine operation in all modern refineries. With the need for effective desalting widely recognized, the main problem today is the selection of that equipment which will do the most efficient job at the least possible cost.

When you need new or additional desalting facilities, keep these points in mind:

■ ***The first electric desalter was designed and installed by Petreco engineers.***

This was nearly a quarter of a century ago. The subsequent years of solid, practical experience in dealing with (and solving) desalting problems all over the world now enable Petreco desalting to yield salt removals in the 98-100% range. The fraction of a cent per barrel desalting cost is saved many times over by the gains in refining efficiency resulting from a clean charging crude.

■ ***The first chemical desalter was designed and developed by Tretolite engineers.***

Tretolite chemical formulations were the first ever to be used in desalting. Tretolite desalting units are the only exclusively chemical desalters ever to be sold and installed in the refining industry and are currently used to desalt a million and a half barrels per day. In fact, every important development in crude oil desalting has resulted from the Petrolite research, engineering and development program.

YOU GET 98-100%

SALT REMOVAL WITH

PETRECO ELECTRIC

OR TRETOLITE

CHEMICAL DESALTING

Because Petreco offers both kinds of desalters, the company has no "axe to grind". This means that you get an honest and objective appraisal of the method best suited to your operation.

There is no other desalting equipment on the market today that can offer you comparable efficiency of design. The operating records from installations around the world *prove* it! There's no other company, either, that can offer you Petreco's fund of desalting technology or Petreco's rich background in this highly specialized field.

PETROLITE CORPORATION

PETROLITE LIMITED

TRETOLITE COMPANY DIVISIONS

PETRECO DIVISION

SUBSIDIARY AND AFFILIATED COMPANIES

CANADA, Edmonton, Alberta • **GERMANY**, Frankfurt, a. M.
VENEZUELA, Caracas

REPRESENTATIVES

ARGENTINA, Buenos Aires • **BRAZIL**, Rio de Janeiro • **COLOMBIA**, Bogota
ITALY, Rome • **JAPAN**, Tokyo • **KUWAIT**, Kuwait • **MEXICO**, Mexico, D. F.
NETHERLANDS, The Hague • **PERU**, Talara • **TRINIDAD**, Port of Spain

Security,

the bit with the

extra bite!

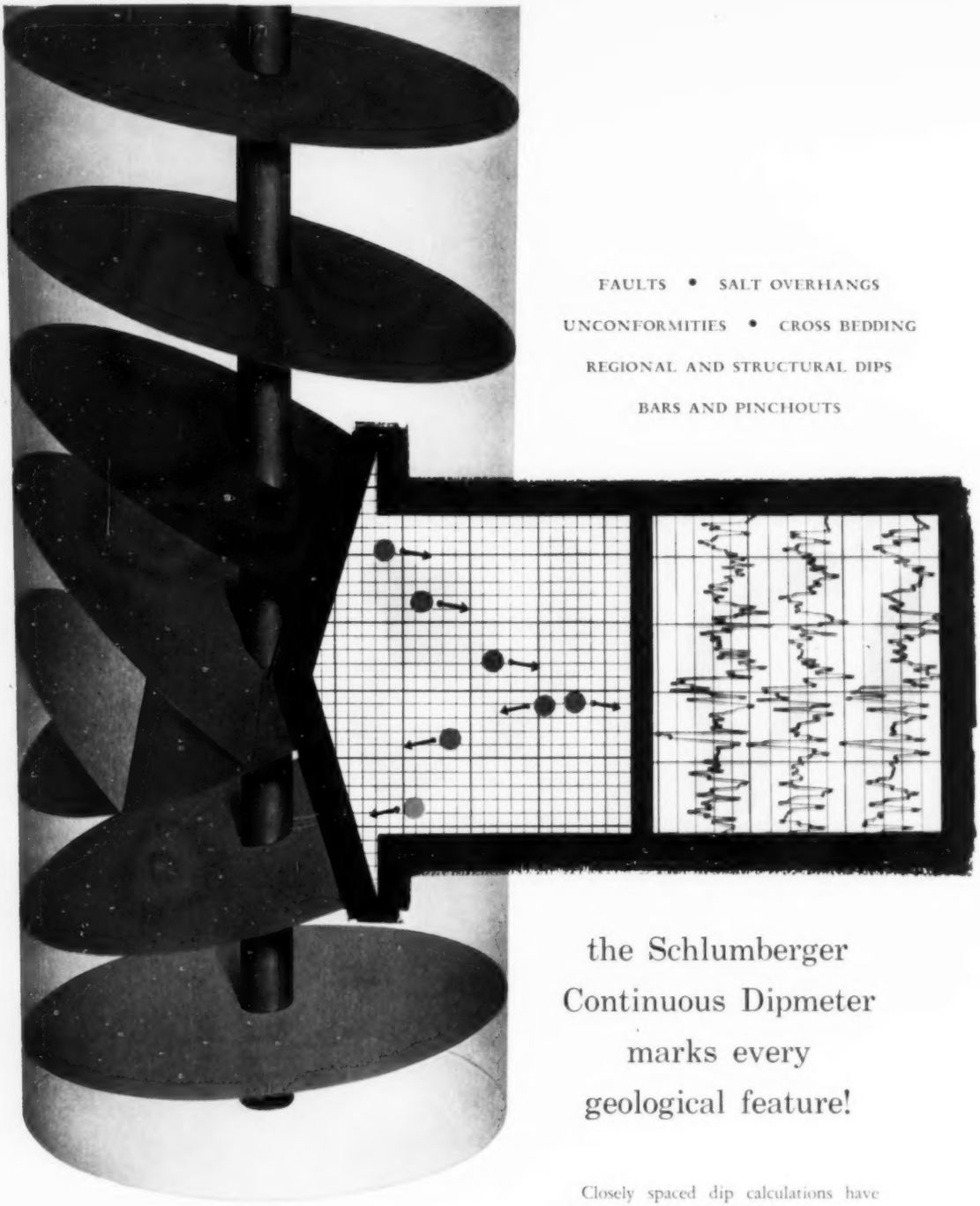
Pave the way to pay dirt fast with Security bits! Today, Security offers over 1150 sizes and types, designed to fit every drilling need. Security FIRSTS are built into every bit. Exclusive gas heat treating techniques assure maximum quality metal control. All-new, electronic equipment controls and checks bearings to microscopic-fraction accuracy. New Extended Jet bits give closer-to-bottom cleaning action with added penetrating speed. Exclusive nail-locks for jet bit nozzles make old-fashioned snap rings obsolete!

OVERSEAS:
- Security International Division of Dresser (Great Britian) Limited
  197 Knightsbridge London SW-7, England
- Security International Division of Dresser Italy, S.p A.
  Via Sardegna No. 29 Rome, Italy
- Security International Division of Dresser Limited, C.A.
  Apartado 6659 Caracas, Venezuela

Security® ENGINEERING DIVISION
P. O. Box 13647
Dallas, Texas

Plants: Dallas, Texas; Whittier, California; Manchester, England
Export Offices: Security Engineering Division, 122 E. 42nd St , New York 17, N.Y.

DRESSER INDUSTRIES, INC.



FAULTS • SALT OVERHANGS

UNCONFORMITIES • CROSS BEDDING

REGIONAL AND STRUCTURAL DIPS

BARS AND PINCHOUTS

the Schlumberger Continuous Dipmeter marks every geological feature!

Closely spaced dip calculations have clearly marked the fault on the graph above. Other structural or depositional features are likewise recognizable by their characteristic dip patterns.

The Continuous Dipmeter gives you a wealth of geological information from a single bore hole. Call your nearest Schlumberger engineer for a discussion of the outstanding results obtained with the Continuous Dipmeter.

SCHLUMBERGER

EUROPE

Impact of the new European Community on mineral oil supplies of Western Europe

By Professor Dr. Dr. h. c. Friedensburg, President
Deutsches Institute Für Wirtschaftsforschung

It would be a mistake to regard the oil problems of Western Europe solely under the aspect of needs and consumption. Of course, the oil fields of Germany, Austria, The Netherlands, France, and Italy are far from satisfying the needs of these densely populated and highly industrialized countries. But the combined production of crude in Western Europe (Europe here and in the following report does not include the communist countries) reached 13 million metric tons (about 90 million barrels) in 1959, a quite respectable quantity in relation to the size of the area.

In 1959 the world's leading oil producer, the United States, produced 347 million tons in an area of 3.56 million square miles, an output of 97 tons per square mile. In Western Europe (1.34 million square miles) the relation is 10 tons and in the Soviet Union 15 tons per square mile. Nearly one-tenth of the whole consumption of mineral oils in Western Europe (1959 = 140 million tons) has been provided by domestic production.

Owing both to new discoveries—especially in western Germany, southern France, and southern Italy—and to very active exploration, crude production of Western Europe is growing much faster than world production as a whole. In 1938 the share of Western Europe in world oil production was less than ½%; in 1950 0.8%; and in 1959 1.3%. Thus the much investigated subsoil of the oil continent has proved in recent years to be more productive than the experts had expected.

Even in comparison with fast rising consumption, the increase in crude production has been remarkable. In 1938 inland production of crude oil in Western European countries covered about 3% of consumption. In 1959 the proportion rose to more than 9% (Table 1); and it is quite possible, or even likely, that for some time to come the rise in crude production will be somewhat faster than the rise in requirements.

Oil from the Sahara: The foregoing statements hold true for Western Europe in the proper sense. If the newly developed oil finds in northern Africa are taken into account, the overall picture of European oil supplies would be still more favorable. Capacities and installations in the French Sahara will permit an oil output of not less than 25 million tons (about 500,000 barrels daily) in 1965, and by 1970 this figure can easily be doubled. The French government regards the whole Algerian territory as part of metropolitan France, and its production as European output.

In fact, the vast desert areas 400-600 miles from the coast so far have been quite undisturbed, since the empty sand does not offer protection for the usual hit-and-hide tactics of the insurgents. But, of course, the political future of the hinterland will not remain unaffected by the coming decisions about Algeria itself. The pipelines from Hassi Messaoud and Edjelé to the Mediterranean pass through the rather densely populated coastal districts of Algeria and Tunisia—the fate of which, especially the degree of connection with Western Europe today, is more uncertain than ever.

Under these circumstances, the great possibilities of Sahara oil should be included in all considerations about the European oil situation, but as a rather uncertain asset. The new and important discoveries in Libya near the Mediterranean coast of North Africa can be left out in this connection, since Libya is an independent country and so far has no official political or economic links with the West European countries. But since the development in the enormous territory of the French Sahara is still in progress, one might—provided the present or a similar political structure continues—well expect therefrom a very important contribution to the needs of the European continent itself.

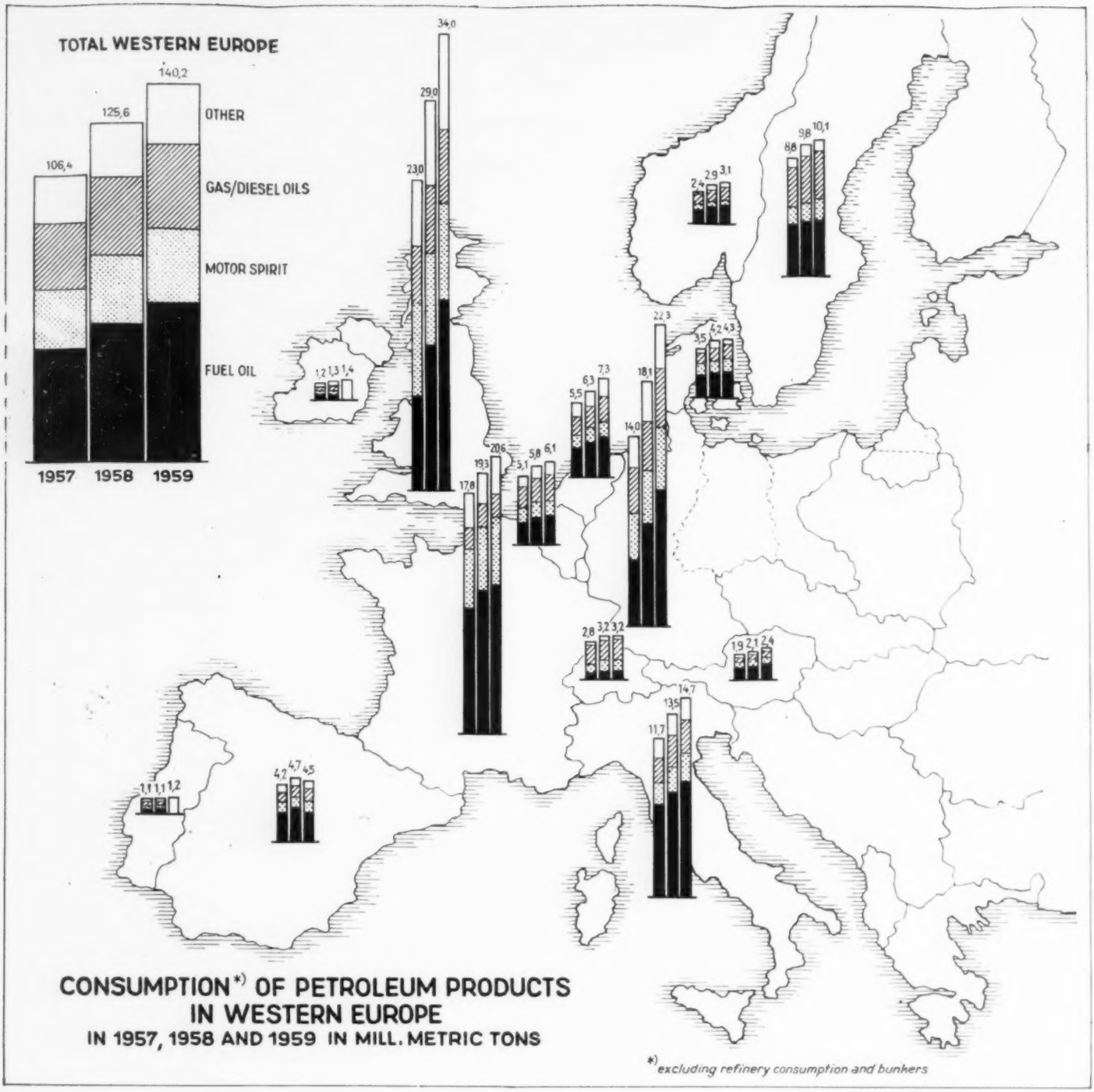
Even without considering these resources outside of Europe, but so far under direct European influence and without considering the European oil fields proper, the situation of Western Europe with respect to crude oil supply is rather a favorable one. Just before the gates of the oil continent there are the enormous and not yet entirely known resources of the Near East, Iraq, Iran, Saudi Arabia, with their fast rising production and their unparalleled reserves. It is true, their political structure is far from being stable and trustworthy. But whether under the present kings and sheiks and generals, or under a furious Mossadegh or under a revolutionary junta or under some sort of bolshevist puppet regime, their whole economic future depends upon the exploitation of their only wealth, the oil deposits; and this exploitation, in turn, depends upon the markets in which to sell the oil. Since the Western Hemisphere and the Soviet world are more than saturated themselves, there is practically no other outlet worthwhile for the Near Eastern oil except Western Europe. Even there, it has to compete with Venezuelan and Soviet oil and with the rapidly increasing oil deliveries of, on the whole, superior quality from the North African deserts.

In 1959 not less than 82% of the crude imports of Western Europe came from the Near East (Table 2), 10% from South America, and 3% from the Soviet Bloc-countries. The United States shipped not more than 1.46 million tons (about 29,200 b/d) mostly to Great Britain and France. Of course, the United States supplies several European countries, which have no refineries of their own, with oil products on rather a large scale; so Great Britain received in 1959, 0.68 million tons (13,600 b/d) of refined products from the United States. The part eastern oil plays in the supply of Western European countries varies between 82% (German Federal Republic) and practically 100% (Ireland and Portugal). These figures will be altered. As we have seen, North Africa in the future will provide considerable quantities of crude oil to Western Europe, since the two pipelines from the fields to the Mediterranean have been completed in their initial program and oil is now flowing at the rate of 40,000 tons daily to tankers. So far most of the Sahara oil goes to France, but it will probably soon be

TABLE 1
CRUDE OIL SUPPLY OF WESTERN-EUROPEAN COUNTRIES
(Millions of metric tons)

	1938		1950		1959	
	Production	Imports	Production	Imports	Production	Imports
Austria	0.1	0.2	1.5	—	2.5	0.5
Belgium-Luxemburg	—	0.3	—	0.4	—	6.7
Denmark	—	0.0	—	0.0	0.0	0.0
Federal Republic (Germany)	0.6[1]	1.2	1.1	1.9	5.1	16.7
France	0.1	6.8	0.1	13.7	1.6	31.7
Great Britain[2]	0.1	2.3	0.2	4.6	0.2	40.2
Greece	—	—	—	—	—	1.6
Ireland	—	—	—	—	—	0.8
Italy	0.0	1.5	0.0	4.4	1.7	24.9
Netherlands	0.2	0.6	0.7	4.7	1.8	12.7
Norway	—	—	—	0.0	—	0.1
Portugal	—	—	—	0.3	—	1.3
Sweden	—	0.1	0.1[2]	0.9	0.1[2]	2.6
Switzerland	—	—	—	—	—	—
Spain	—	—	0.1[2]	0.3	0.1[2]	4.2
Other	0.0	—	—	0.5	—	—
Western Europe	1.1	13.0	3.8	31.7	13.1	144.0

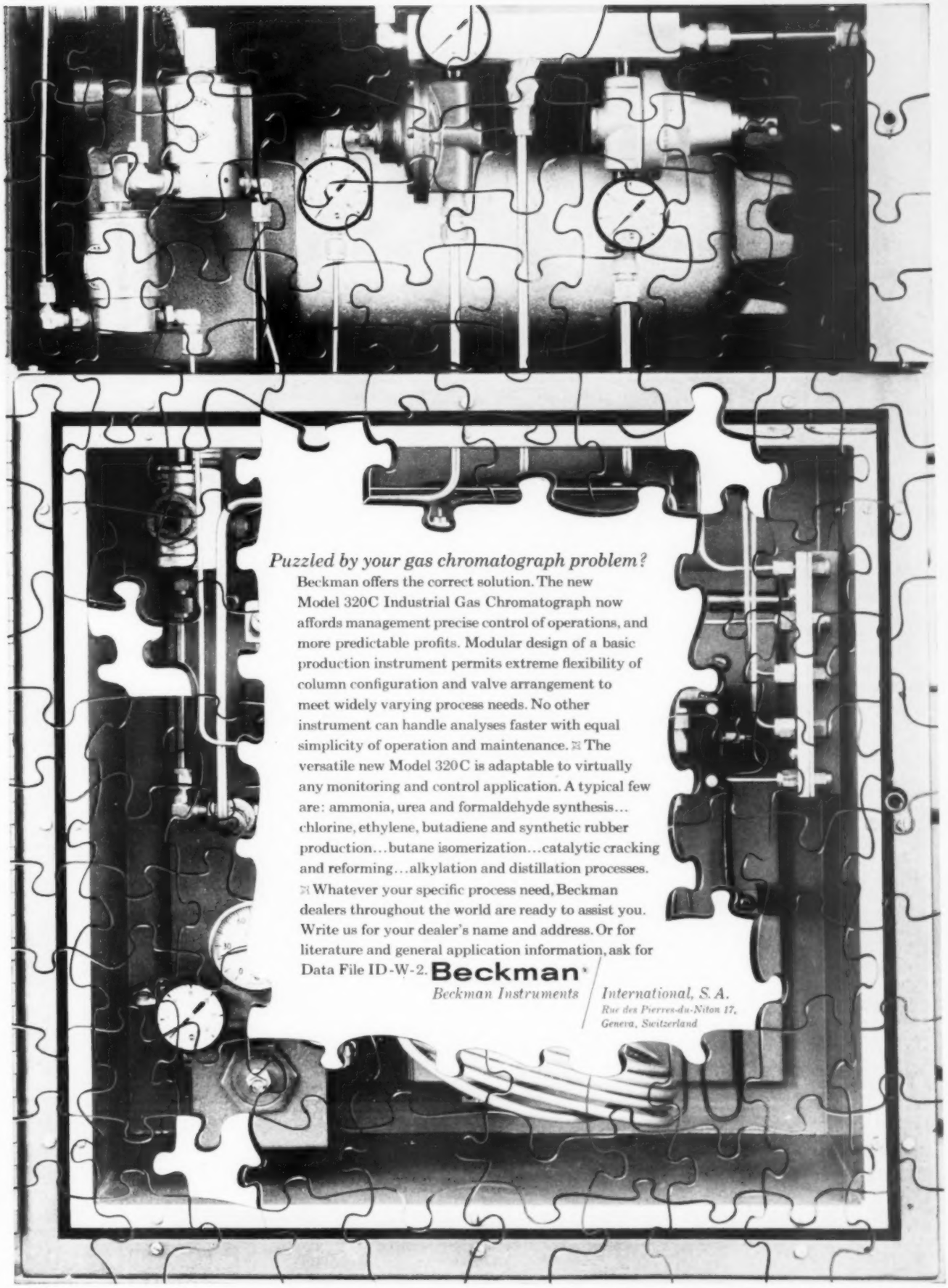
[1] Germany, [2] Shale oil, [3] Incl. shale oil



shipped to Italy and Germany as well. Libya is not yet ready for export.

Soviet Oil in Western Europe: In the last few years increasing amounts of Soviet oil have been appearing on the markets of Western European countries. It may be doubted whether Russian oil is indeed being produced in quantities in excess of inland needs. Although the government publishes the exact export figures rather promptly, and although the figures which correspond correctly with the trade statistics of the free countries concerned may be relied upon, it is very difficult to ascertain the reasons for the increasing sale and to foretell future prospects. Certainly a good deal of the crude oil is being offered to western countries with the unmistakable purpose of obtaining foreign exchange badly needed for buying western raw materials and machinery. Since neither the quantity nor, certainly, the quality of Russian industrial goods would be sufficient to attract foreign buyers and compensate for imports, the planners in Moscow have to resort to the export of gold and to the export of raw materials.

On the other hand, there is no doubt that oil production in several parts of the vast Russian territory is rising very fast, and may be sufficient to furnish a surplus for some years—especially since the use of motor cars is surprisingly far behind the situation in Western Europe, not to speak of the United States (in the USA there is one car for every three persons; in Great Britain, for eleven; in West



Puzzled by your gas chromatograph problem?

Beckman offers the correct solution. The new Model 320C Industrial Gas Chromatograph now affords management precise control of operations, and more predictable profits. Modular design of a basic production instrument permits extreme flexibility of column configuration and valve arrangement to meet widely varying process needs. No other instrument can handle analyses faster with equal simplicity of operation and maintenance. ¤ The versatile new Model 320C is adaptable to virtually any monitoring and control application. A typical few are: ammonia, urea and formaldehyde synthesis... chlorine, ethylene, butadiene and synthetic rubber production...butane isomerization...catalytic cracking and reforming...alkylation and distillation processes. ¤ Whatever your specific process need, Beckman dealers throughout the world are ready to assist you. Write us for your dealer's name and address. Or for literature and general application information, ask for Data File ID-W-2.

Beckman®

Beckman Instruments International, S.A.
Rue des Pierres-du-Niton 17, Geneva, Switzerland

Manufacturing facilities / Beckman Instruments, Inc., Fullerton, California / Beckman Instruments, G. m. b. H., Munich, Germany / Beckman Instruments, Ltd., Glenrothes, Scotland

TABLE 2—THE ORIGIN OF WESTERN EUROPE'S OIL SUPPLY
(Millions of Metric Tons 1959)

Countries	Production	Crude Oil Imported From: All Countries	Middle East	South America	Western Europe	Eastern Bloc	Others	Production	Refinery Products Imported From: All Countries	Western Europe	Middle East	South America	Eastern Bloc	Others
1. Austria	2.46	0.45	—	—	—	0.45	—	1.82	0.45	—	—	—	0.45	—
2. Belgium-Luxemburg	—	6.72	6.19	0.51	0.02	—	—	6.23	2.74	1.51	0.17	0.13	0.43	0.50
3. Denmark	—	0.04	—	—	—	—	0.04[1]	0.04	4.55	3.33	0.06	0.82	0.10	0.24
4. France	1.60	31.30	27.30	2.45	—	0.01	1.54	27.93	2.30	0.43	0.20	0.16	1.33	0.18
5. Great Britain	0.15	40.20	29.90	5.79	—	—	4.51	35.30	13.43	3.08	1.49	5.98	0.03	2.85
6. Greece	—	1.56	1.35	—	—	0.21	0.00	1.38	0.41	0.16	0.04	0.01	0.17	0.03
7. Ireland	—	0.82	0.80	—	—	—	0.02	0.75	0.92	0.70	0.03	0.13	—	0.06
8. Italy	1.48	24.86	21.45	0.75	—	2.24	0.42	24.79	0.68	0.02	0.03	0.01	0.53	0.09
9. Island	—	—	—	—	—	—	—	—	0.40	0.02	—	0.03	0.35	0.00
10. Netherlands	1.76	12.68	10.22	2.12	0.26	—	0.08	14.99	5.18	1.53	1.26	0.57	0.11	1.71
11. Norway	—	0.11	—	0.11	—	—	—	0.10	3.23	1.99	0.04	0.69	0.37	0.14
12. Portugal	—	1.34	1.31	0.01	—	0.02	—	1.17	0.36	0.03	0.06	0.24	—	0.03
13. Sweden	0.09	2.57	2.05	0.41[2]	—	0[3]	0.11	2.55	8.50	5.62	—	—	1.44	1.44[4]
14. Switzerland	—	—	—	—	—	—	—	—	3.31	3.05	0.09	0.04	0.09	0.04
15. Spain	0.08	4.16	4.16	—	—	—	—	3.93	0.85	0.15	—	—	—	0.70[5]
16. Western Germany	5.12	16.79	13.72	2.69	0.00	0.31	0.07	19.96	5.53	2.94	0.36	0.79	1.04	0.40
Western Europe	12.74	143.60	118.45	14.84	0.28	3.24	6.79	140.94	52.84	24.56	3.83	9.60	6.44	8.41

Germany, for 14; in the Soviet Union, in Poland, and in Hungary, for about 500).

If ever this enormous gap is filled (and one day it will be), the present oil surplus will probably be superseded by a deficit. But the present oil situation in Western Europe is characterized by growing offers of Russian oil which must be accepted if the western countries desire to receive some sort of payment for their exports. Since this trade is almost entirely regulated by very careful commercial treaties, the impact of Russian crude is not dangerous for the Western European markets, although the offers are always accompanied by so low a price that neither the poor quality nor the competition of other resources would be prohibitive. Apparently prices in Soviet export trade are never determined by prime costs, but solely by the market situation; and it is probable—as is certain for coal exports—that in many cases the prices obtained are far from covering the costs of production and transport. But in the Soviet economic system such a loss is of no importance if the trade has to accomplish other tasks: in this case to furnish foreign exchange. The rapid construction of several pipelines from the interior of Russia to the western boundaries of Poland may indicate that the Soviet government reckons upon a continuation of this export for some time to come, not to mention the necessity of supplying oil to Poland and the Soviet-occupied part of Germany. So far, Italy is receiving the bulk of these deliveries, and is said to have been selected as an intermediary agency for more oil exports to other western countries.

The Refinery Situation: Still more powerful than the present situation in the supply of crude is Western Europe's refinery capacity, and there is rarely a month without the inauguration of a new plant. Until the last war, the West European countries were preponderantly importers of refinery products. In 1938 they bought and produced 14 million tons of crude (about 280,000 b/d) and imported 22 million tons (about 440,000 b/d) of refinery products. Now we have the reverse situation: In 1959 the combined quantity of production and imports of crude was 157 million tons (3,140,000 b/d), and imports of refined products not more than 29 million tons (580,000 b/d), with the trend rapidly continuing in this direction. In 1959 the combined capacity of all refineries in Western Europe amounted to 180 million tons annually (3,600,000 b/d) (Table 3), nearly 30% more than combined consumption. Actual refinery production was 141 million tons (about 2,820,000 b/d) in 1959. Adding imports of 29 million tons (580,000 b/d), there were available 170 million tons (about 3,400,000 b/d)—so that rather significant exports, almost equalling imports, have been possible. Western Europe has reached self-sufficiency in refinery products, and may soon find herself in the position (provided there are sufficient market outlets) of an important exporter. Of course, this is true only for the total of all European countries. Besides countries with large refinery capacity, there are several others with considerable consumption such as Denmark, Norway, and Switzerland which depend almost entirely on imports of products.

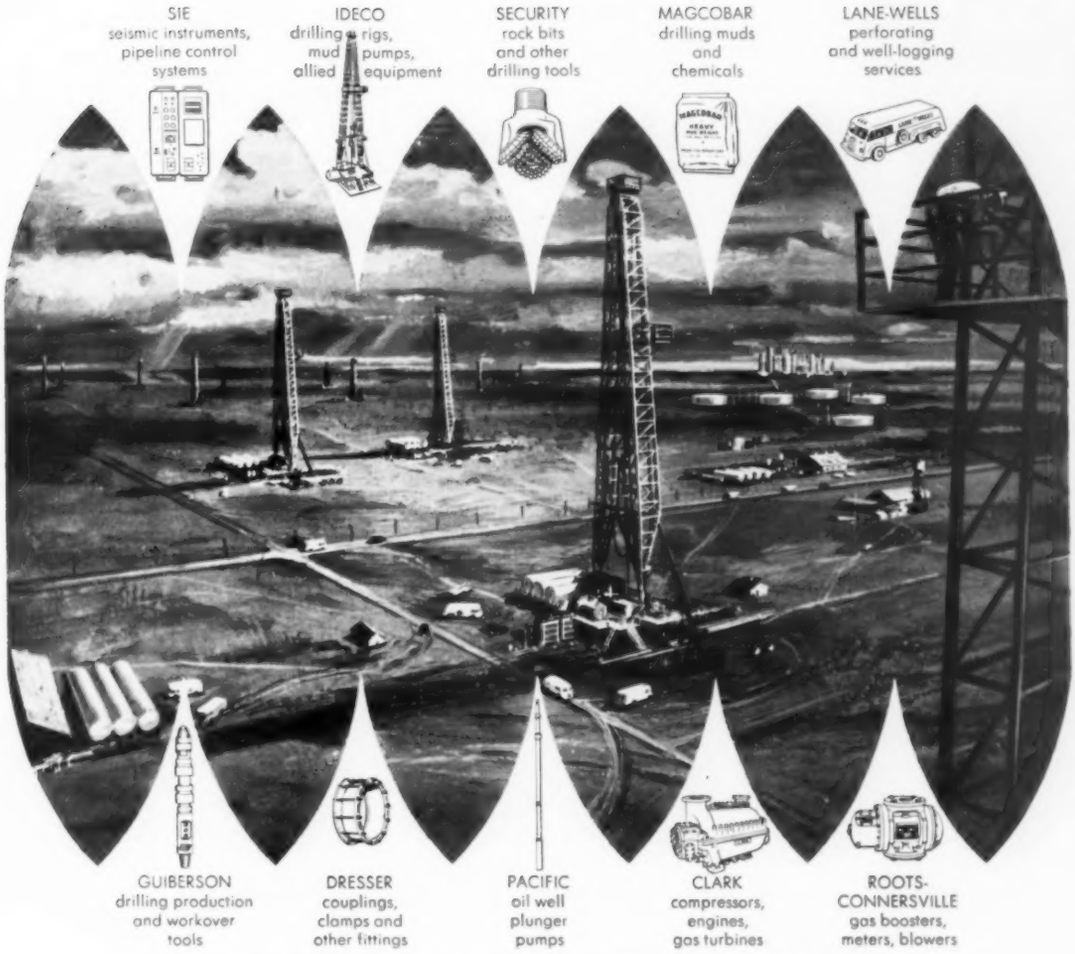
Consumption: Undoubtedly oil consumption in Western Europe is growing more rapidly than the international average. From 1938 to 1959 total oil consumption of all countries in Western Europe rose to 140 million metric tons from 26 million tons by 450%; whereas the increase in world consumption has been only 360%. The remarkable recovery of the European economic structure—to a great extent due to the generous help of the USA after the losses and destruction of the last war—is being reflected in the rapid extension of industry and transport with a corresponding demand for oil of all sorts. Of course, the development has not been quite equal in all countries concerned. On account of shifting frontiers, the year 1938 is not suitable for statistical comparison. But from 1950 to 1959 oil consumption in Western Europe rose by 160%. For the German Federal Republic alone, the rise was nearly 500%; for France, 110%; for Belgium, 140%; for The Netherlands and Spain, 160%; for Italy, 180%; and for Switzerland, 190%. The main factor in this development has been the consumption of petrol ("benzin" or "gasoline"), diesel oil, and fuel oil—with percentage participation, respectively, 19%, 22%, and 42%. Note: Fuel oil's part is rising. In 1938 it amounted to 19% and in 1950 to 35%. There is no doubt this percentage will grow.

Oil In The New European Communities: Even for the average European citizen, it is difficult to understand exactly the embarrassing multiplicity of European organizations which have risen from zero after 1945; in most cases at the instigation of the helpful USA government. But only a few of them have attained importance for the oil supply. The much cited OEEC (Organization for European Economic Cooperation) is only a consultive body, although certainly very useful with its numerous publications. Especially in the past few years it has devoted much work to the energy problems of Western Europe, and its reports have found wide publicity; but even in economic politics the OEEC is without real influence, and there would be no change in the trend of European oil supply if the OEEC did not exist at all.

Among all the other new organizations in the political, military, and economic fields there is only one to which can be attributed practical importance in oil problems, and that is the European Economic Community (EEC) which came into being on January 1, 1958, with the task of integrating the economics of its six members, Belgium, France, Germany, Italy, Luxembourg, and The Netherlands. Its work is of high practical importance within a limited geographical scope. During a period of 15 years the six countries are to abolish entirely all customs duties among themselves, and are to equalize all exterior duties—with the consequence that they will form a real economic unity. The gradual reduction of tariffs is being carried out already, and it may be accomplished long before the originally planned date. The community has a parliament in common with the European Coal and Steel Community and the European Atomic Energy Community; in a way, it has a proper government (the "Commission"). Along with the other two organizations, it is developing fast and unmistakably into a supernational structure despite some fail-

TABLE 3
REFINERIES IN WESTERN EUROPE

Country	Number of refineries in production	Combined capacity in million tons
Austria	8	2.2
Belgium	7	8.0
France	13	34.6
West Germany	23	37.0
Great Britain	14	43.4
Greece	1	1.4
Ireland	1	2.0
Italy	32	34.5
Netherlands	2	17.9
Portugal	1	1.5
Spain	3	7.4
Sweden	5	2.4
Western Europe	110	192.3



Dresser is everywhere in the WORLD of OIL and GAS

Starting with exploration—and all the way to the end of the pipeline—you will find Dresser equipment, Dresser technology, Dresser ideas and Dresser services working throughout the world.

Seismic instruments . . . drilling rigs, on land and offshore . . . drill bits, drilling tools and drilling muds . . . compressors, engines, gas turbines . . . mud pumps and oil well plunger pumps . . . perforating and well-logging services . . . oil well production and workover tools . . . pipeline couplings, clamps and fittings . . . electronic pipeline control systems . . . gas boosters, meters, blowers—**all are provided everywhere by Dresser Industries, a world-wide group of integrated companies and licensees.**

The world of oil and gas is a Dresser world. And it's a world that's yours to use confidently, no matter where you operate. Call on the men of Dresser . . . rely on the products and services of Dresser . . . anywhere in the world.

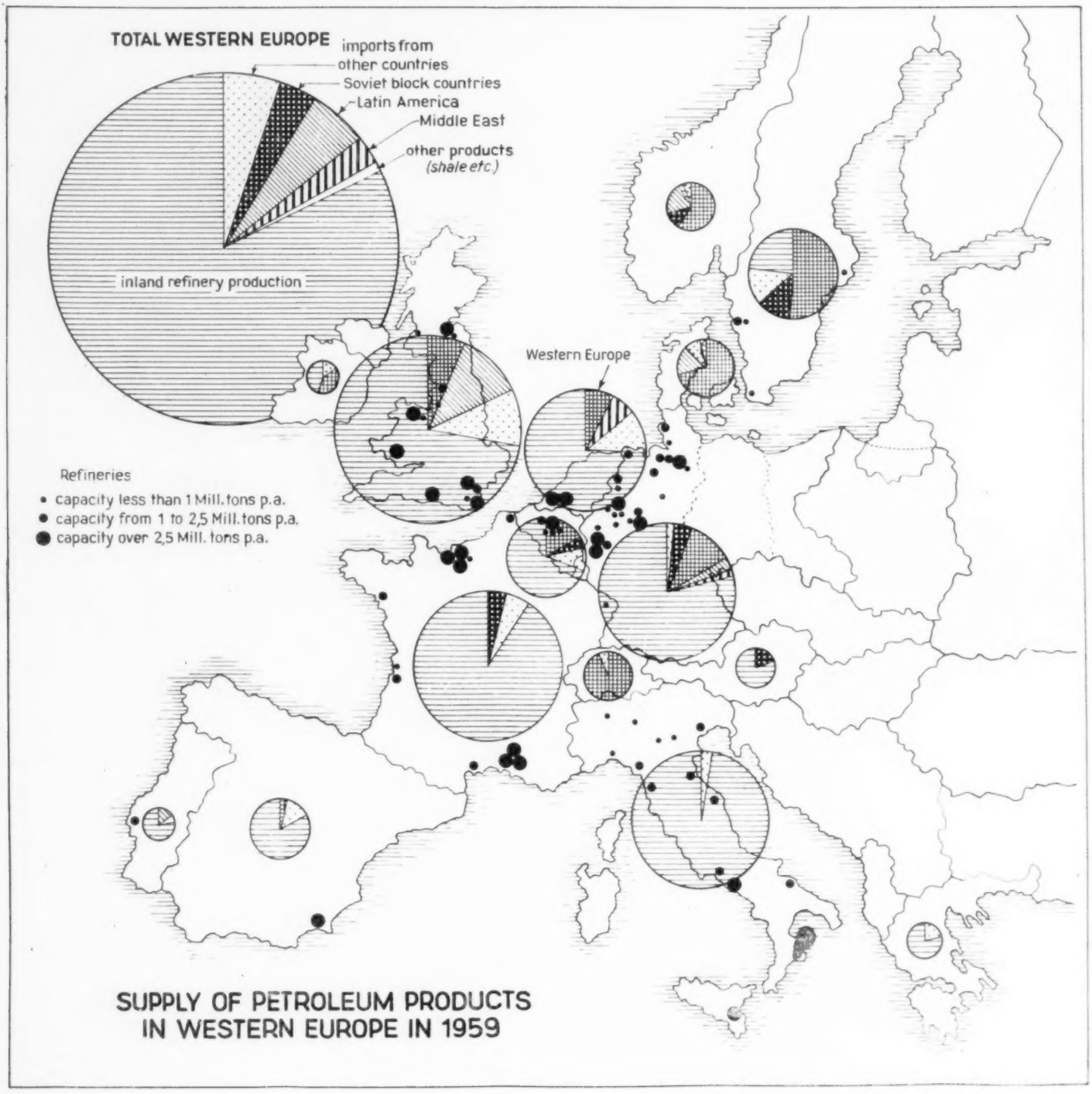
DRESSER INDUSTRIES, INC.
Republic National Bank Building
DALLAS, TEXAS, U.S.A.

INTERNATIONAL REPRESENTATIVES

ARGENTINA: Dresser A. G., Viamonte 867, Buenos Aires
ENGLAND: Dresser (Great Britain) Ltd., 197 Knightsbridge, London S.W. 7
FRANCE: Dresser (France) S. A., 37 Avenue d'Iena, Paris 16
ITALY: Dresser Italy, S.p.A., Piazza Cavour 3, Milan
MEXICO: Dresser A. G., Paseo de la Reforma 95-1102, Mexico City 4
SWITZERLAND: Dresser A. G., Muhlebachstrasse 43, Zürich
VENEZUELA: Dresser A. G., Edificio Radio Continente, 6° Piso, Ave. Mexico, Los Caobos, Caracas

Agents in the principal cities of the world

Equipment and technical services for the oil, gas, chemical, electronic and other industries

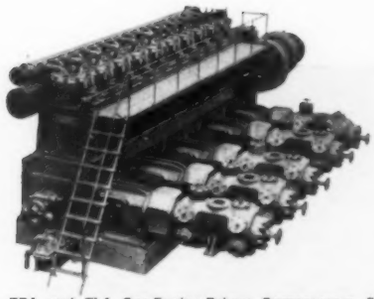


ures and disappointments in the beginning.

From the point of view of mineral oil supply, the EEC has the effect that crude and products will flow freely between all producers and consumers of the six member states with a total population of 160 million people. The result will be that, within its territory, no barriers either for crude or for refinery products will be permitted. For example, preferences granted to home crude in the Federal Republic of Germany will have to disappear, and it is not yet certain how much of the present production will then survive. The majority of the other members have no duties of a comparable level, and the new common tariff is to be the average of the duties existing in the six member states. There are also considerable differences between the duties on refinery products within the community. So the coming adjustment will hurt many plants at present developed under this protection, with commercial consequences not yet quite calculable—especially since in the treaties many possibilities are provided for with respect to the mitigation of hardships during the transition period.

There is no doubt that at the end there will be established a big new block of producers and consumers in this part of Western Europe. Whatever this development may cause in the form of individual losses and difficulties, the future structure of mineral supplies of the six countries will be stronger than the existing one.

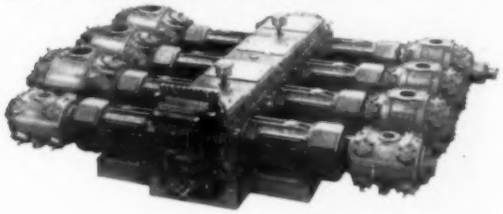
END

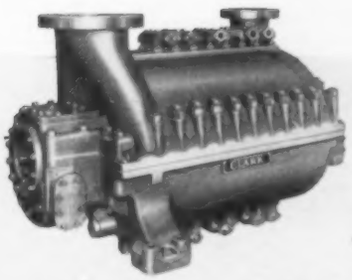


Models TRA and TLA Gas-Engine-Driven Compressors—2-cycle, turbocharged. Ideal where large blocks of horsepower are required. They offer maximum power per unit of floor space, as well as excellent fuel economy. Model TRA is available with 6, 8, and 10 cylinders, 1100 to 1800 bhp. Model TLA is available with 5, 6, 8, and 10 cylinders, 1700 to 3400 bhp.

RECIPROCATING

Models CLBA, CLRA, CJA, CMB, CMA and CFA Motor-Driven Compressors for heavy duty process applications. These balanced/opposed compressors are built in seven stroke sizes—6", 8", 8¾", 11", 14", 17" and 19". Available with 2 to 10 compressor cylinders depending on model chosen. Pressures from vacuum to over 36,000 psi.

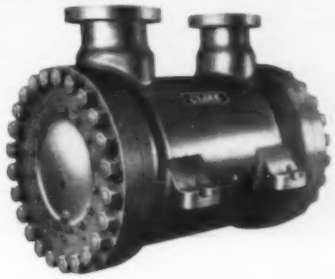




Type HS Horizontally-Split Centrifugal Compressors are highly dependable multi-stage units used extensively in petroleum processing. Seven case sizes are available in capacities ranging to over 150,000 cfm. Up to ten stages of compression in a single case. Cooled or uncooled types available to meet process requirements.

CENTRIFUGAL

Type VS Vertically-Split Centrifugal Compressors are multi-stage units designed for extremely high pressures—to over 5,000 psig. Four case sizes have a capacity range from 200 discharge cfm to 20,000 suction cfm. Barrel-like outer case provides maximum strength. Inner case is horizontally split for easy accessibility



CLARK COMPRESSORS

as international as the world-wide petroleum processing industry

Wherever petroleum is processed, you will find Clark compressors on the job or readily available. The complete line of Clark centrifugal and reciprocating compressors, with motor and gas engine drives, are manufactured in the U.S.A. and under license in Europe. Regardless of where manufactured, all Clark units and components are identical and completely interchangeable. Whether they carry the name plate of Clark (U.S.A.), Weir-Clark (Great Britain), Dujardin-Clark (France), CDT-Clark or CNR-Clark (Italy), they are the same efficient Clark compressors, designed and built to provide a lifetime of dependable service with minimum maintenance. All are guaranteed by Clark. For complete performance and application data, write to the offices listed below:

CLARK®
ENGINES
COMPRESSORS • GAS TURBINES

DRESSER INDUSTRIES INC.
OIL • GAS • CHEMICAL
ELECTRONIC • INDUSTRIAL

CLARK BROS. CO. OVERSEAS OPERATIONS DIV.
122 East 42nd Street, New York 17, N. Y

CLARK BROS. CO. DIVISION, Dresser (Great Britain) Ltd.
197 Knightsbridge, London S.W. 7, England

CLARK BROS. CO. DIVISION, Dresser (France) S.A.
37, Ave D'Iena, Paris 16, France

CLARK BROS. CO. DIVISION, Dresser Italy, S.p.A.
Piazza Cavour, 3, Milan, Italy

AUSTRIA

EXPLORATION: Petroleum has been produced in Austria since 1930. Cumulative output, including 1960, has been 40,207,020 tons. Petroleum is now produced in the Vienna basin (by OeMV, RAG, Van Sickle) and in Upper Austria province (RAG). Exploratory drilling is being carried out in the Vienna basin (OeMV), in Upper Austria (RAG), and in Vorarlberg province (Vorarlberger Erdölges.mbH).

OeMV: State company OeMV produced in 1960 92% of crude and 99% of gas in Austria. In November 1960, company's well Aderklaa No. 80 discovered oil for the first time in the Alpine lime zone of the Vienna basin in the interval between 9,941 ft and 10,040 ft. In April 1959, wel Aderklaa No. 78 had discovered a gas horizon at 9,187 ft. The presence of oil in the Mesozoic limestone of the Vienna basin may open new vistas.

In view of the decline in crude production, OeMV has worked out a production program for known reserves. Accordingly, crude output is to be reduced to 1.85 million tons (37,000 b/d) by 1965. Of OeMV's 31 million tons of proved reserves, 22 million tons are to be extracted between 1959 and 1969. The rest, nine million tons, is to be recovered between 1970 and 1980. Despite an increase in the number of producing wells from 620 in 1955, to 785 in 1959 and 810 in 1960 the average daily yield per well has decreased to 8.3 tons and 7.4 tons, respectively, from 15.6 tons.

Investments in 1960 were made in the value of $29.5 million, of which $19.2 million were spent for processing: 85% of OeMV's revenues came from crude oil, the rest from natural gas. The share of gas will increase in the future. The supply of consumers with gas has been secured for the next 15 years. Since most of the known fields are drilled up, the total footage to be drilled in the coming years will be reduced: Footage in 1960 was 426,530 ft; it is to be 410,125 ft in 1961, and 337,315 ft in 1962. However, the share for exploration will remain constant at about 131,240 ft. The drilling of production wells will be reduced gradually to permit a gradual reduction in drilling crews. Between 1960 and 1963, drilling of only 100 to 120 production wells is envisaged.

In mid-1960, OeMV's concession areas, totaling 2,725 square miles, were enlarged by new concessions (St. Corona, Hollabrunn, Laa/Thaya, St. Poelten) covering 1,262 square miles. In all four concessions OeMV had already made geophysical surveys, and had drilled tests in Laa and Hollabrunn. Royalty in the new concessions is 8%, against 15% in the old concessions. OeMV has 39 rotary drilling rigs; the number of rigs in operation throughout 1960 averaged 13.

RAG: The company's crude output is rising, due to the development of the Ried field, Upper Austria province, where 12 oil wells are in production, and two at Steindlberg and one at Puchkirchen. Crude yield in RAG's concessions in the Vienna basin (Gaiselsberg and Zistersdorf) has remained stable at about 110,000 tons per year. Besides the drilling of extension wells in the Ried field, RAG has been active in exploration in the new concession areas of Wels and Pettenbach (Upper Austria province). To date, RAG has invested $10 million in its Upper Austria concession; revenues have been a mere $600,000. So far, 20 deep wells have been drilled (total footage: 143,849 ft) and 7,014 shot holes (total footage: 940,341 ft). The company has four drilling rigs, of which at least two were in operation throughout 1960.

Vorarlberger: West Germany's "Preussag" Co. is drilling for Vorarlberger Erdölsges.mbH the first wildcat in Austria's westernmost province. Well Dornbirn No. 1 showed traces of gas at 8,055 ft. Preussag is drilling at its own expense, but will share profits with Vorarlberger if Dornbirn No. 1 is productive. Geophysical company "Prakla," of West Germany, will survey the terrain at Bezau and Egg.

Vienna Memorandum: In the *Vienna Memorandum of May 10, 1955,* the Austrian government acknowledged the claim of USA, British, and French firms to restitution or compensation for rights and property possessed prior to March 13, 1938 (annexation of Austria by Germany). A great step towards a complete implementation of the *memorandum* was made in July 1960, when several agreements were signed between the Austrian State and Western oil firms. The Austrian government agreed to pay Shell, Mobil Oil, and RAG $13.7 million as compensation for former rights and properties. Half of the sum is to be transferred to OeMV as a credit for the construction of its Schwechat refinery; the other half will be invested in Austria by the companies themselves. The companies also agreed to found the nonprofit "Crude Oil Utilization Co." (OeMV 74%, Shell and Mobil Oil 13% each) which is to regulate crude runs to the refineries of the companies concerned. Furthermore, the Austrian State ceded to Shell and Mobil Oil its $600,000 share in the "Austrian Mineral Oil Works Co.". In addition, RAG was given new concession areas at Wels (137 square miles) and at Pettenbach (173 square miles). In 1955, RAG had received concessions at Salzburg-Braunau, Bad Hall, Ried, and Feldbach totaling 1,737 square miles.

PRODUCTION: Production in 1960 is estimated at 2,441,712 tons (45,409 b/d) of crude oil (1959: 2,458,784 tons) and 1,471,876,000 cubic meters (66.69 billion cubic feet) of gas [1959: 1,128,007,400 cubic meters (39.83 billion cubic feet)]. Decline in crude output is due to natural depletion of known deposits and failure to discover new deposits.

Reserves: Proved reserves in the Lower Austria province (Vienna basin), as of January 1, 1961, were: crude—36.4 million tons (247 million barrels), dry gas—456.0 billion cubic feet, and wet gas 351.3 billion cubic feet. 90% of the oil reserves are in the Matzen field, which at present accounts for 82% of the total petroleum production. Oil reserves of RAG's Ried field, Upper Austria province, are estimated at one million tons. Recoverable petroleum varies between 40% and 60%. The largest gas field lies at Zwerndorf; two-fifths of it extends into Czechoslovak territory. The recoverable gas in the Zwerndorf field is estimated at 353.1 billion cubic feet. Additional quantities of dry gas in the amount of 105.9 billion cubic feet are stored in the gas horizons of the Matzen oil field. At the beginning of 1960, 913 oil wells (OeMV—783; RAG—81; Van Sickle—49) and 60 gas wells (all OeMV) were in production.

REFINING: Primary processing capacity of Austria's eight refineries remained unchanged in 1960 at 48,000 b/d (OeMV 62%; Shell, Vacuum, Van Sickle 38%). Completion of OeMV's new 32,000 b/d Schwechat refinery in January 1961 enabled this company to either shut down or adapt to other production three of its four out-dated refineries. OeMV also did not renew the lease contract for Lobau refinery (Shell/Mobil Oil).

Consumption of petroleum products in 1960 was 2.55 million tons, only a slight increase over 1959's 2.42 million tons. END

AUSTRIA—Oil Consumption (Metric Tons)

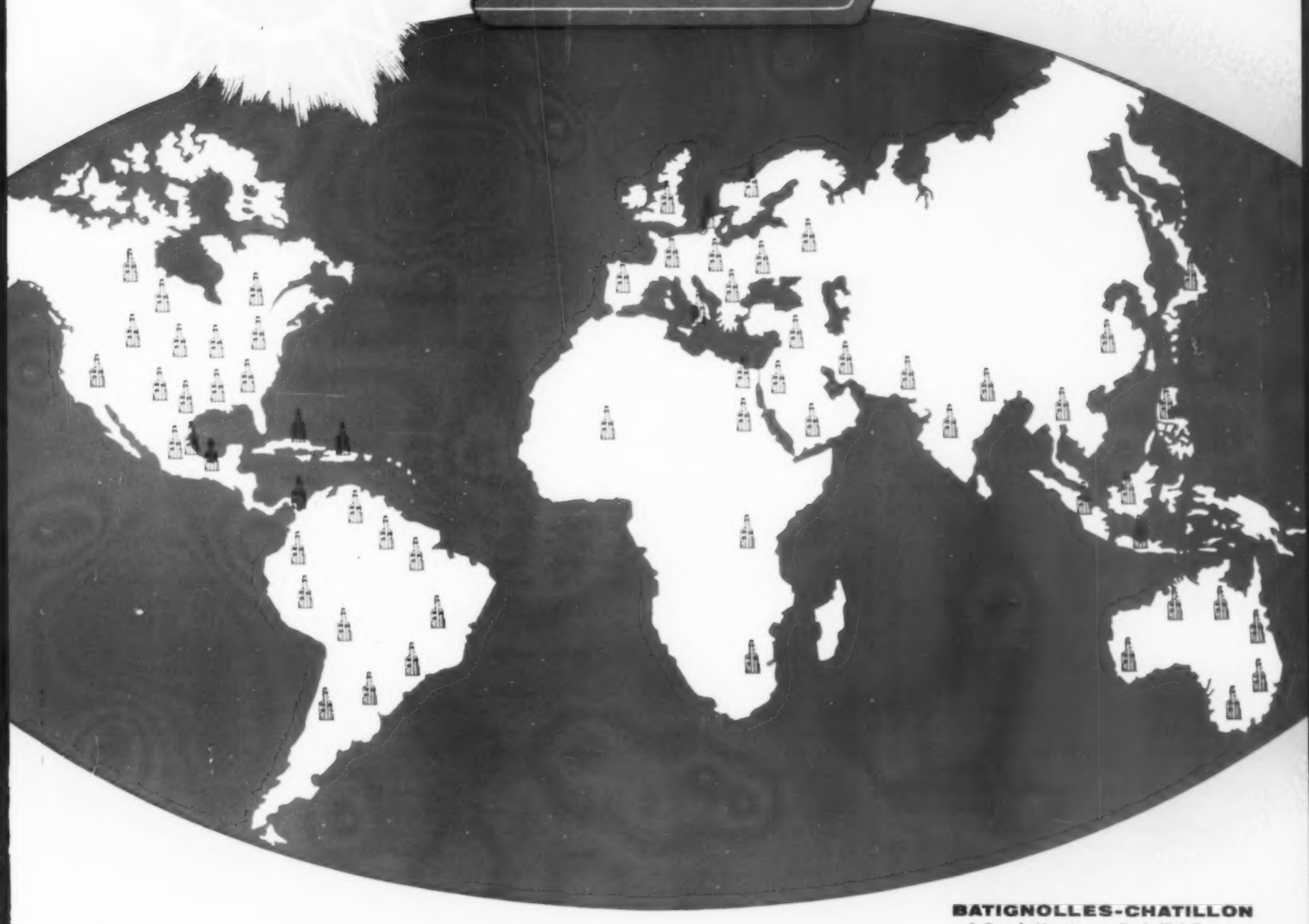
	1960 (Est.)	1959
Motor gasoline	564,000	504,909
Special boiling point gasoline	16,490	16,438
Kerosine	10,420	16,426
Gas oil	461,260	461,359
Fuel oil	1,284,200	1,224,138
Lubricating oil	99,700	88,936
Asphalt	122,630	110,867
Total	2,558,700	2,423,073

AUSTRIA—Oil and Gas Production, 1960

	Oil (Metric Tons)			Gas (Thousand Cubic Meters) WET			DRY		
Company:	OeMV	RAG	Van Sickle	OeMV	RAG	V. Sickle	OeMV	RAG	V. Sickle
January	192,613	12,114	2,085	21,169.9	864.0	10.4	126,130.9	99.0	55.5
February	180,204	12,183	1,936	22,803.2	889.5	9.9	124,132.4	53.5	46.8
March	192,344	14,250	2,065	24,999.0	975.5	11.0	115,294.7	26.9	14.6
April	186,174	15,724	1,997	23,743.6	1,011.5	10.9	97,014.3	1.5	3.0
May	192,763	15,936	2,088	20,300.1	1,013.2	11.5	82,775.0	—	62.6
June	185,908	14,973	1,995	18,850.7	907.7	11.2	80,160.0	—	122.1
July	189,394	14,755	2,050	19,965.1	876.7	11.6	81,313.3	—	145.7
August	189,224	14,578	2,048	20,510.7	853.6	11.4	78,298.5	—	134.8
September	182,941	13,939	1,985	18,733.2	815.6	11.3	89,227.2	—	119.7
October	188,581	14,737	2,028	20,423.1	879.8	11.6	100,124.0	—	100.2
Nov. (Est.)	182,900	14,500	2,000	18,900.0	900.0	11.0	115,000.0	—	100.0
Dec. (Est.)	182,000	14,700	2,000	20,000.0	1,000.0	11.0	130,000.0	—	100.0
Total (Est.)	2,245,046	172,389	24,277	250,099.6	10,987.1	132.8	1,209,470.3	181.2	1,005.0

The Sun never sets on
this Mark of Quality

PACIFIC®



Now 8 great plants custom-build Pacific Pumps for world-wide refinery service

In every major refining area throughout the world, Pacific Centrifugal Pumps are operating 24-hours a day in the multitude of special refinery, petrochemical, chemical and other processing services. Pacific Pumps are universally recognized for superior performance . . . long service life . . . trouble-free operation . . . low maintenance costs. Whether these pumps are built in Pacific's American plant or by one of the carefully selected foreign manufacturers—identical integrity of design, engineering, workmanship, materials and service is assured. Through these world-wide facilities, centrifugal pumps of Pacific design may be purchased in Sterling, Francs, Guilders, Marks, Dollars or other foreign currencies. We encourage your inquiries.

BATIGNOLLES-CHATILLON
5, Rue de Monttessuy, Paris (7e), France

HIRO ZOKI CO., LTD.
Subsidiary of Sumitomo Machinery Co., Ltd., Tokyo, Japan
(Hiro Zoki's plant in Kure, Japan)

HITACHI, LTD.
Tokyo, Japan
(Hitachi's plant in Kameari, Japan)

KELLY & LEWIS LTD.
Subsidiary of Brambles Industries, Ltd.
Springvale, Victoria, Australia

KONINKLIJKE MACHINEFABRIEK GEBR. STORK & CO.
N. V. (V.M.F.) Hengelo (o), The Netherlands

THE PULSOMETER ENGINEERING COMPANY LTD.
Nine Elms Iron Works, Reading, England

RUHRPUMPEN G.m.b.H.
Division of RUHRSTAL A.G.
Stockumer Strasse 10-Witten-Annen, Germany

DRESSER A.G., International Representative
MUHLEBACHSTRASSE 43, ZURICH, SWITZERLAND

PACIFIC
CENTRIFUGAL PUMPS FOR PETROLEUM CHEMICAL UTILITY & GENERAL INDUSTRIES
OIL WELL PUMPS

DRESSER INDUSTRIES INC.
OIL • GAS • CHEMICAL
ELECTRONIC • INDUSTRIAL

PACIFIC PUMPS
Inc. . . A Division of Dresser Industries, Inc.
HUNTINGTON PARK, CALIFORNIA, U.S.A.

CYPRUS

EXPLORATION: The whole of the island and its territorial waters are at present covered by two oil exploration licenses. One license is held by a Cypriot and covers 1½ square miles. The remainder of the island and its territorial waters are covered by a license issued in 1957 to the Forest Oil Corp., an American company.

During the years immediately following the end of World War II the Petroleum Development (Cyprus) Ltd., a subsidiary of the Iraq Petroleum Co. Ltd., held an oil exploration license and carried out preliminary geological studies and some seismic work, over a period of two years, but did not subsequently make application to proceed to the oil prospecting stage.

Since the country became a republic on August 16, 1960, there has been no oil activity. Forest Oil Corp. will try to convert its license to a final concession contract by the end of 1961.

REFINING, MARKETING, TRANSPORTATION: There is no refining or important transportation facilities. The island's needs for oil are very small.

A "national" company was set up in Cyprus in 1960 to distribute what is reported to be Rumanian and other Soviet-bloc petroleum products.

The company has been established by the five Lefcaridis brothers, a firm of Greek Cypriot transport contractors. They are marketing gasoline, kerosine, and fuel oil under the brand name of "Petrolina."

CYPRUS—IMPORTS[1] AND RE-EXPORTS, 1959
(Thousand barrels)

IMPORTS:	L.P.G.[2]	Gasoline Avia.	Gasoline Other	Jet fuel	Kero-sine	Gas oil	Fuel oils[3]	Lubri-cants	Asph	Total
United States	—	20	—	—	—	—	—	9	—	29
Neth. Antillies	—	41	—	17	2	—	—	—	—	60
France	4	—	74	128	26	89	455	—	—	779
Italy	4	—	89	—	99	150	63	—	30	435
Spain	2	—	—	—	—	—	—	—	—	2
United Kingdom	—	12	—	—	—	—	—	13	1	26
Aden	—	—	306	182	53	165	121	—	—	827
Bahrain	—	—	—	—	7	8	—	—	—	15
Iran	—	—	—	—	11	17	—	2[4]	—	28
Isreal	2	—	—	—	—	—	—	1	—	3
Kuwait	—	—	—	—	—	—	65	—	—	65
Lebanon	4	—	—	—	—	—	—	—	—	4
Saudi Arabia	—	—	—	—	4	21	—	—	—	25
Syria	—	—	—	—	—	—	—	1	—	1
Other	—	—	—	—	—	—	—	2	—	2
Total	16	73	469	327	202	453	707	24	31	2 304

RE-EXPORTS:

	Gasoline Avia.	Gasoline Other	Kerosine	Fuel Oil	Total
Italy	10	—	—	—	10
Bunkers	—	23	10	1	34

[1] In addition, 1,000 barrels petroleum wax from India.
[2] Liquefied petroleum gas.
[3] Includes some diesel oil.
[4] Includes 1,000 barrels petroleum wax from India.
Source: "Statistics of Imports and Exports," 1959, Nicosia, through the United States Department of State.

OIL LAWS

Oil exploration and development are governed by Cap. 122 of the Laws of Cyprus. The Governor in council may grant Oil Licenses (Exploration, Prospecting and Mining). Such licenses may be subject to regulations made under this law. In view of the fact that so far in Cyprus none has wished to proceed further than the oil exploration stage, no regulations governing the precise conditions which would be included in any prospecting or mining licenses have been made. The oil exploration licenses so far granted have, however, been rather lengthy documents containing clauses which would otherwise appear as regulations if any such regulations were made. The government may consider the advisability of making regulations under Cap. 122 if there is a possibility of anyone wishing to proceed to the oil prospecting stage, and, in this event, would undoubtedly be guided by similar regulations in force in other British colonial territories. END

DENMARK

EXPLORATION: No exploration was performed during 1960, and the licenses held by Jersey Standard were surrendered in 1959. For a review of previous exploration and of wells drilled, see WORLD PETROLEUM REPORT 1960, page 257. Deutsche Erdoel, a German independent company, began preliminary discussions with the government during 1960 for oil exploration rights over acreage in South Denmark, near its own production in Germany. The acreage was formerly held by Esso, and before that by Gulf.

REFINING AND TRANSPORTATION: There is no production and no pipeline network. Several companies are considering refineries. Tidewater Oil Co.'s Danish subsidiary, Danks Veedol, has let contracts to two European firms for immediate construction of Denmark's first refinery, a 20,000 b/d plant at the seaport of Kalundborg, scheduled to go on-stream by September 1961.

Caltex is the latest U. S. firm to consider Denmark as a location for a possible new refinery in northern Europe.

Gulf Oil Corporation has announced its decision to construct an oil refinery at Stigsnaes in southwestern Zealand, Denmark. One of the salient factors influencing the choice was the excellent potential harbor facilities which will accommodate the largest and most modern tankers.

The refinery will process one and one half million tons of crude oil per year (30,000 b/d) which will be directed into Gulf's Scandinavian markets. It is expected that the refinery will be in full production by the end of 1962.

MARKETING: Following 1959's 7% increase to 4,254,000 tons, Dansk Esso expects inland consumption of petroleum products in 1960 in Denmark to rise by about 10%, mainly due to an upsurge in the demand for black oils and turbo jet fuels. After 1961, the company forecasts annual increases of between 5 and 6% annually, so that by 1967 oil will cover over three-quarters of the country's energy requirements as compared with 57% in 1959. In 1959 consumption of motor gasoline rose by 9%, gas oil by 11%, diesel oil by 18%, and kerosine, mainly for domestic purposes, by as much as 36%. Fuel oil consumption showed a rise of only just over 1%, owing to considerable electricity imports from Sweden in the first half of the year, and to highly competitive coal prices.

OIL LAWS

Oil is subject to Law 181 of May 8, 1950 which sets only general conditions for development and exploration. For more details on what the government demands, see the concession contract granted to Danish American Petrospecting Co., owned by Gulf and then by Jersey Standard companies, dated 2 June 1950 and amended 13 April 1957.

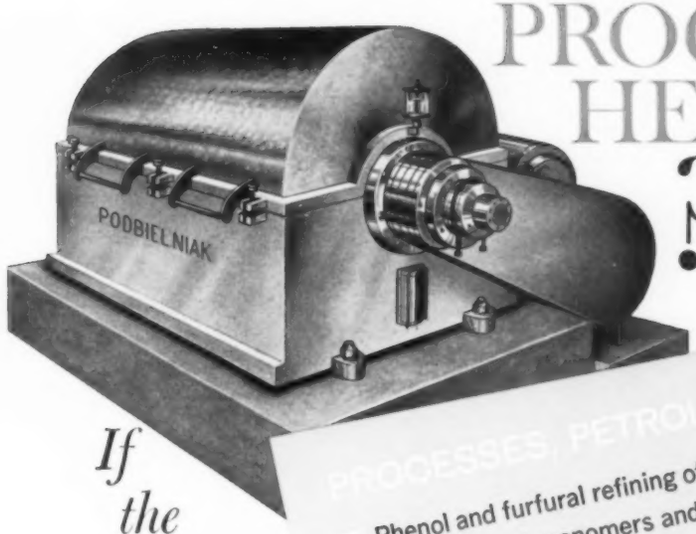
For a translation of Law 181 and of the concession (with its amendment of 1957) the editor recommends *Europe—Basic Oil Laws and Concession Contracts*, a word-for-word translation of this law and concession which contains laws and concessions in force in the remainder of Europe as well. It is maintained current by bound supplements which contain new legislation in all countries of Europe. For information on this highly respected publication please communicate directly with the publisher, *Petroleum Legislation Ltd., Post Office Box 1591, Grand Central Station, New York 17, New York.*

NATIONAL FACTORS

The investment climate is generally favorable. There is no discrimination against internationally-owned companies and taxation rules are generally equitable. A detailed review of taxation within the country has been prepared and is available. It is made along the lines of the section in the Colombian part of this volume, entitled Colombia—Petroleum Industry Taxation. Reference is made to that section for general format and for notice of availability.

One of the prinicipal concerns of the government and companies in Denmark has been the

IS YOUR PROCESS HERE ?



PROCESSES, PETROLEUM, REF

- Phenol and furfural refining of lube and gas oils.
- Separation of monomers and polymers by solvent extraction.
- Purification of gasoline additives.
- Acid treating, caustic neutralization and water washing of lube oils.
- Extraction and purification of lube oil soluble sulfonates.

If the answer is "YES"... you will want to know more about Podbielniak centrifugal liquid-liquid extractors

The Podbielniak extractor accomplishes multiple-stage counter-current extraction even though the liquids are in contact for only a fraction of a minute. The application of centrifugal force up to 2000 G's enables these high-capacity, compact units to extract liquids with little difference in density, those easily emulsified and those of high viscosity. ■ Rapid response to changes in flow rates, solvent ratios and interface positions assures maximum versatility and flexibility of operation. Design variations are also possible to provide phase separation of co-currently mixed liquids or to change inlet positions for handling a wide variety of liquid-liquid systems in a single extractor. ■ Cut costs by replacing inefficient, outmoded equipment. Modernize and simplify your plant operation with Podbielniak extractors or phase separators. ■ Write for complete data or send us information about your specific needs.

CLARK BROS. CO. DIVISION, Dresser (Great Britain) Ltd.
197 Knightsbridge, London S.W.7, England
CLARK BROS. CO. DIVISION, Dresser (France) S.A.
37, Ave. D'Iena, Paris 16, France
CLARK BROS. CO. DIVISION, Dresser Italy, S.p.A.
Piazza Cavour 3, Milan, Italy
CLARK BROS. CO. OVERSEAS OPERATIONS DIV.
122 East 42nd Street, New York 17, N. Y.

PODBIELNIAK®
CENTRIFUGAL SOLVENT EXTRACTORS, LABORATORY FRACTIONAL DISTILLATION APPARATUS, AND PACKAGED DISTILLATION PLANTS

DRESSER INDUSTRIES INC.
OIL • GAS • CHEMICAL
ELECTRONIC • INDUSTRIAL

encroachment of Russian crude oil. In 1957 Denmark imported 52,148 tons of Russian oil products, in 1958 46,086 tons and in 1959 69,936 tons.

In May, 1959, a new agreement on exchange of goods was signed between the Soviet Union and Denmark covering the period of June 1st, 1959 to May 31st, 1961, in which it was expected that 500,000 tons of oil should be imported in the course of the above 24 months. None of the existing oil companies in the country, however, wished to take Russian oil, for which reason the Russian exporters were obliged to sell their products, mainly heavy fuel oils, direct from ship to the tanks of major consumers. Five large Danish power plants have entered into a contract according to which 150,000 tons of heavy fuel oil must be purchased from Russia during the period in which the trade agreement is valid. The power plants in the first six months of 1960 purchased a total of about 80,000 tons of Russian fuel oil. It is doubtful whether the quantity stipulated in the trade agreement will be sold in the country; for the present time it is estimated that only about half of the above quantity, 250,000 tons, will be supplied. END

EIRE

EXPLORATION: Ambassador Oil Corp., of Fort Worth, Texas, holds exploration rights covering the entire republic. Its license was confirmed, and a final contract was signed during 1960. It had been delayed pending approval of the Petroleum and Other Minerals Law which went into effect early in 1960. No exploration has been performed by Ambassador yet under the contract.

PRODUCTION, REFINING, MARKETING: There is no production of crude oil in Eire. There is one refinery, the 40,000 b/d plant of Irish Refining Co. Ltd., owned 40% by Shell Mex/British Petroleum, 40% by Esso, and 20% by Caltex. The plant reported crude throughput of 2,477,198 bbl in the first three months of 1960. Crude imports in the quarter came to 84,266,021 Imperial gallons, about 60,000,000 of it from Iraq and the rest from Saudi Arabia.

The basic process engineering design of the refinery was by Esso Research & Engineering Co., and engineering and construction was placed with The Lummus Co. Ltd. Contracts were awarded to George Wimpey & Co. Ltd. for the marine terminal, Tank Erectors Ltd. for the tankage, and P. J. Hegarty Ltd. for the refinery buildings. Every effort was made to use to the maxmum Irish personnel and Irish materials; and, of the total cost of approximately £12 million for the refinery, approximately £3 million was spent in Eire. Before the commencement of construction, The Lummus Co. negotiated an agreement with a group of local Irish unions covering conditions of employment, and, in general, relations with these unions were very satisfactory during the course of construction; the job has been free from any disputes of a major nature.

Refinery design is based on a crude distillation capacity of 39,600 b/cd of Middle East crude; and the refinery processing units consist of an atmospheric crude topping unit, a catalytic reforming unit for octane upgrading of virgin naphtha, a copper sweetening unit, and a middle-distillate catalytic desulfurization unit.

Considerable thought was given to the possible location for the refinery. The main factor influencing this decision was the necessity to accommodate the large-size tankers being used in the crude-oil trade. It was finally decided to build the refinery near Cork harbor, where there are deep-water facilities for these large tankers.

A new Irish company—Shannon Estuary Co.—has a £30 million ($84 million) plan to establish an industrial area including a deep-water transhipment port at the mouth of the River Shannon. The first stage envisaged is the construction of a 1½-mile jetty costing £12 million, giving access to water 60 ft deep and connected with the southern shore of the estuary by a 1,100-ft causeway. The jetty would be capable of taking ships up to 150,000 tons. A large £2½ million drydock also forms part of the scheme. Oil transhipment is one of the primary aims of this project, and it is reported several oil companies are understood to be interested. The scheme is now before the government for consideration.

OIL LAWS

The petroleum legislation of Eire (Ireland) is reviewed in detail in *Petroleum Legislation*, a reference service which covers the world's oil laws and concession contracts. A copy of this review may be obtained from its publisher, *Petroleum Legislation Ltd., P. O. Box 1591, Grand Central Station, New York 17, N. Y.*

During 1960 the petroleum legislation of Eire took a long stride forward with passage of the Petroleum and other Minerals Development Act of December 10, 1959, which has been incorporated in an Act passed by the Dail and Senate. The legislation is not concerned with general proprietary rights in land, but only with the divesting of private rights in petroleum and their transfer to the government, thereupon proceeding to "make further and better provision for the working and development of petroleum," amending the Minerals Development Act of 1940. It has the merit of containing a more precise definition of petroleum than is normally found in legislation.

The act specifies three phases, regulated respectively by the terms of a petroleum exploration license, a petroleum prospecting license and, finally, a petroleum lease. A novel feature is the additional so-called "reserved area license" which "at any time after the grant of a petroleum lease, the Minister may grant to the leasee, in respect of a specified area surrounding the land to which the lease relates" [Section 19(1)]. Its result is to give the holder of a petroleum lease the same rights in respect of the reserved area over which he is granted a license "as would be exercisable by him if he were in fact the holder of an exploration license in respect of that area." Furthermore, the Minister may not grant "to any other person an exploration license, a petroleum prospecting license or a petroleum lease in respect of the area to which the reserved area license extends."

It states "No person, other than the Minister, shall search for petroleum in any area in the State unless—(a) he is the licensee under an exploration license, a petroleum prospecting license or a reserved area license which is for the time being in force and includes that area, or (b) he is the lessee under a petroleum lease which has not expired and which includes that area" [6(1)].

Amounts of license and lease fees, and of rentals, are not laid down in the Development Act itself. As far as exploration licenses and prospecting licenses are concerned, these "shall be granted upon such terms and conditions and in respect of such areas as the Minister thinks fit and specifies therein" [8(2) and 9(3)]. On the granting of the license, "the licensee shall pay to the Minister such consideration therefor as the Minister, with the concurrence of the Minister of Finance, may determine" [8(3) and 9(4)]. As regards a petroleum lease, "such lease shall be made subject to the payment to the Minister of such moneys, whether by way of fine or preliminary payment or by way of rent (including a royalty rent) or by any or all of such ways as the Minister, with the concurrence of the Minister of Finance, shall think proper and shall agree upon with the lessee [13(2a)]. The Minister of Finance, incidentally, must be made a party to a lease [13(12d)].

Terms of duration, and renewal, of licenses and leases are similarly left to ministerial determination. A probably unique provision is that "The Minister may enter into an undertaking with any person to grant to him an exploration license or a petroleum prospecting license or both these licenses. Where the Minister enters into an undertaking under this section, it shall be lawful for him to carry out the undertaking" [7(1 and 2)]. The Minister may similarly enter into an undertaking in resepct of a petroleum lease. The full purport of these provisions will no doubt be revealed in practice; it would appear that they may perhaps give rise to a number of somewhat difficult points of law.

The Minister (for Industry and Commerce) may explore and prospect for, work and dispose of, petroleum provided there is not any kind of petroleum license or lease already held in respect of the area, that 20 days' notice is given, and that a map showing the boundaries of the area is deposited with the Geological Survey, Dublin, and in one or more places in the locality [11(1 and 2)], [14(1-4)].

The holder of a petroleum lease may enter on the land specified therein and use such land "in such manner as may be reasonably necessary for the working of petroleum or for any purpose incidental thereto" [15(1)]. When, in the exercise of this right damage or nuisance is caused directly or indirectly, by the lessee (or the Minister), compensation is payable.

In the matter of compensation, the Mining Board established by Section 33 of the Minerals Development Act of 1940 plays the role of adjudicator. It is important to note that, though the immediate effect will be to vest the property in petroleum in the Minister of Industry and Commerce, compensation in respect of private property rights in petroleum is not payable until the petroleum is brought to the

A little error, obviously . . .

embarrassing, to arrive
like this on a date . . .
but how much greater
your consternation
if you fail to select
the right catalyst
for your process.

We furnish
high quality
Cracking Catalysts
in bead form
for TCC- and
Houdriflow-Units

Kali-Chemie
Aktiengesellschaft
Hannover

We furnish
Platinum Catalysts
Sinclair Baker RD-150
Sinclair Baker RD-150 C
Atlantic 16 Catalyst
for Reforming Processes

KCE

Kali-Chemie - Engelhard
Katalysatoren
GmbH · Hannover

EIRE—Customs and Excise Duties on Petroleum Products
Applicable Legislation

Customs Duties on Imported Products	Excise Duties on Home-made Products
Finance (Customs Duties) (No. 4) Act 1931. Finance Act 1934, Section 21 and 7th Schedule, Reference No. 3. Finance Act 1938 Section 19 and 2nd Schedule Part I Reference No. 1. Finance Act 1951 Section 9. Finance Act 1957 Section 10.	Finance (Miscellaneous Provisions) Act, 1935. Finance Act 1935, Section 27 and 8th Schedule Part VII, Reference No. 20 Finance Act 1938, Section 19 and 2nd Schedule Part V Reference No. 6 Finance Act 1941 Section 19. Finance Act 1951 Section 9. Finance Act 1957 Section 10. Mineral Hydrocarbon Oil Regulation 1941 (No. 450 of 1941).
Lubricating Grease	
Finance (Customs Duties) (No. 4) Act 1932 Section 3.	Nil.
Lubricating Oil	
Finance Act 1934, Section 8 and 1st Schedule, Ref. No. 41	Same as for "Hydrocarbon Oil Other Sorts" shown below.
Hydrocarbon Heavy Oil	
Finance Act 1933 Section 7 as amended by Finance Act 1937 Section 11 and 4th Schedule Part V Ref. No. 6 Finance Act 1935 Section 21 Finance Act 1940 Section 18 Finance Act 1942 Section 8 Finance Act 1949 Section 17 Finance Act 1951 Section 9 Finance Act 1956 Section 11 (2) Finance Act 1957 Sections 10 and 11 Finance Act 1958 Sections 14 Mineral Hydrocarbon Oil Regulations 1941 (No. 450 of 1941).	Same as for "Hydrocarbon Oil Other Sorts" shown below. Finance Act 1935 Section 21 Finance Act 1936 Section 22 Finance Act 1940 Section 18 Finance Act 1942 Section 8 Finance Act 1949 Section 17 Finance Act 1956 Section 11 (3) Finance Act 1957 Sections 10 and 11 Finance Act 1958 Section 14 Mineral Hydrocarbon Oil Regulations 1941 (No. 450 of 1941).

surface and used or sold [Section 34]. Allocation of compensation for petroleum thus used or sold is one sphere of the board's activity under the new legislation (and is the concern of Chapter 6). Compensation in respect of land, for damage, nuisance, acquisition and so forth, is necessarily another sphere in which it must act. This is the subject of Chapter 7: Chapter 8 deals with procedural matters.

Ambassador Irish Oil Contract Summary

The main features of the agreement are as follows:

(1) The lessee under the Agreement will be Ambassador Irish Oil Ltd., an Irish registered company, which at present is a wholly owned subsidiary of the Messman-Rinehart Oil Co. of Kansas, USA, but which will become the wholly owned subsidiary of the Ambassador Oil Corp. of Texas, USA.

(2) Ambassador Irish Oil will be given exclusive exploration rights as follows: (a) over the whole of our territory for an initial term of five years and, if they met the obligations which they assume under the Agreement, (b) over 75% of our territory for a further five years, (c) over 50% of our territory for a third term of five years, (d) over 25% of our territory for a fourth term of five years. The company will be entitled to prospecting licenses and mining leases in any area over which they have exploration rights.

(3) In respect of the first three years of the first five-year period, Ambassador Irish Oil are obliged to spend at least $300,000 on exploration and to drill at least one well to a depth of 5,000 ft. If they do not meet both these obligations, the unexpended balance of $300,000 will be forfeit to the Minister and they will lose title to any further prospecting rights or to any mining leases which may have been granted to them in the period.

(4) If the company, having met the obligations referred to in paragraph 3, do not elect to proceed with further exploration they may retain any leases acquired by them up to that time but will have no further right to leases or to explore further for petroleum. If they elect to continue exploration after the first three years, they must spend a further $200,000 during the remaining two years of the first five-year term. If they do not spend all that amount of money in the two years, the unexpended balance is forfeit to the Minister and they will have no further right to exploration licenses or mining leases but they will be entitled to retain any leases earned in the first three years of the period.

(5) If Ambassador Irish Oil fulfill the obligations referred to in paragraphs 3 and 4 and do no more, then they have no right to renewal of their exploration license while, however, retaining title to any leases granted to them during the five years. If, however, the Company actually spends $1,000,000 in the first five years, they will have the right to renewal of their prospecting licenses for a further period of five years but must surrender back to the Minister 25% of the territory.

(6) During the second period of five years, Ambassador Irish Oil will be obliged to spend at least $750,000 but, if they actually spend $2,500,000, they will be entitled to renewal of the exploration license for a third period of five years over 50% of our territory.

(7) During the third five-year term, Ambassador Irish Oil will be obliged to spend not less than $750,000 but, if they actually spend $4,000,000, they will be entitled to renewal of the exploration license for a fourth term of five years over 25% of our territory.

(8) During the fourth term, Ambassador Irish Oil will be obliged to spend not less than $750,000 but, if they actually spend $5,000,000, they will have a preferential right over other applicants (other things being equal) for renewal of their concessions.

(9) If, in any specified period, Ambassador Irish Oil fail to spend the appropriate minimum amount (as referred to in paragraph 3 to paragraph 8 above) then the difference between what they spend and the specified minimum sum is forfeited to the Minister.

(10) If during any five-year term Ambassador Irish Oil have spent more than the minimum amount but not the amount which entitles them to automatic renewal, they may "purchase" such automatic renewal by paying the difference to the Minister.

(11) Excess expenditure in one period will be carried forward to the credit of Ambassador Irish Oil in the next period.

(12) Financial provisions are included with the object of ensuring that Ambassador Irish Oil will satisfy the Minister as to their bona fides and their ability to produce the required sums.

(13) Ambassador Irish Oil will pay to the Minister a royalty of 7½% of the market value of oil and gas produced. The company will also pay to the Revenue Commissioners income and corporation profit taxes on its earned profits but the Minister undertakes to pay Ambassador Irish Oil the difference between—(a) the total amount paid by the company by way of royalties and taxes, and (b) 40% of net income as defined in the Agreement. The payments to be made by the Minister will be so adjusted, however, to provide that the net contribution of the company to the State may never be less than the 7½% royalty which is computed on the selling price of oil or gas. The royalties will be payable whether the company makes a loss or profit on its operations. The Agreement prescribes the method of arriving at net income and it allows charges against gross profits on a more generous scale than is allowed by the Revenue Commissioners in arriving at taxable profits. Abortive exploration costs, for instance, can be charged against the year in which they occurred and a generous depletion allowance will be permissible as well. In calculating the amounts of money (if any) to be paid to the company under this arrangement, 30% will be substituted for 40% of net income during the first five years of commercial production by the company.

(14) While the operators would be liable for ordinary rates on property, etc., it is provided that they will not be liable for rates assessed on the value of the right to drill for petroleum, the value of petroleum produced or the estimated value of the reserves.

(15) The Minister undertakes to promote such amending legislation as may be necessary to give full effect to the Agreement and, in particular, to secure for the State title to such petroleum as is not already in State ownership. The Minister also undertakes that the proposed legislation will provide him with powers to enable the operators to lay pipelines, erect pumping stations, etc.

(16) Ambassador Irish Oil will have the right to assign any or all of its interests acquired under the Agreement to any company or person, provided that the assignee is first approved by the Minister. After the first well has been commenced on any leasehold, the owner of the lease will have the right to assign all or part of his interest to any person without the consent of the Minister. Ambassador Oil Corporation (USA) will have to retain effective control of Ambassador Irish Oil through the holding of its share capital until the first well has been drilled. After that the USA Company will be free to dispose of its holding in the Irish company.

(17) Disagreements between the Minister and the operators will be settled by arbitration.

(18) The Agreement will not come into effect until after the Minister has notified Ambassador Irish Oil of the passing of the legislation.

NATIONAL FACTORS

To give an idea of the relative importance of petroleum in Eire (Ireland), the yield from the customs and excise duties on petroleum products (the chief source of government revenue from oils at this time) was 9.6% of total government revenue in the year ended March 31, 1960. In 1955, some 30% of the total energy consumed in Eire was derived from petroleum and petroleum products. Later figures are not available.

An extensive study of taxation of petroleum in Eire has been compiled for publication in 1961. It forms part of a worldwide series which covers all aspects of petroleum taxation, from exploration through marketing. There is a separate review of this type for each major country of the world. Information on the study can be obtained from its publisher, *International Taxation Series, P.O. Box 2744, Grand Central Station, New York 17, N. Y.* END

BELGIUM

EXPLORATION: No exploration for oil took place during 1960. Several concessions for oil have been granted, however, as shown on the accompanying map. No drilling for oil as such has ever been done in Belgium. But three wells have been taken below 8,000 ft in recent years for geological information, especially in connection with the local coal industry. None of the wells indicated oil possibilities.

REFINING: Amoco Chemical Corp. has joined Petrofina in the formation of a new company, Amoco Fina, which will build a new lube-oil additives plant on the banks of the Scheldt, south of the Fifth Harbour at Antwerp.

Union Chimique Belge SA, Brussels, is building a new 5,000-metric-ton-per-year phthalic anhydride plant at Schoonarde at an estimated cost of $2 million. Badger NV will handle the design, engineering, and construction.

For a tabulation of refineries and their capacities, reference is made to *World Petroleum Report 1959*, as well as to the tabulation of refineries contained under the WORLD section of this 1961 report.

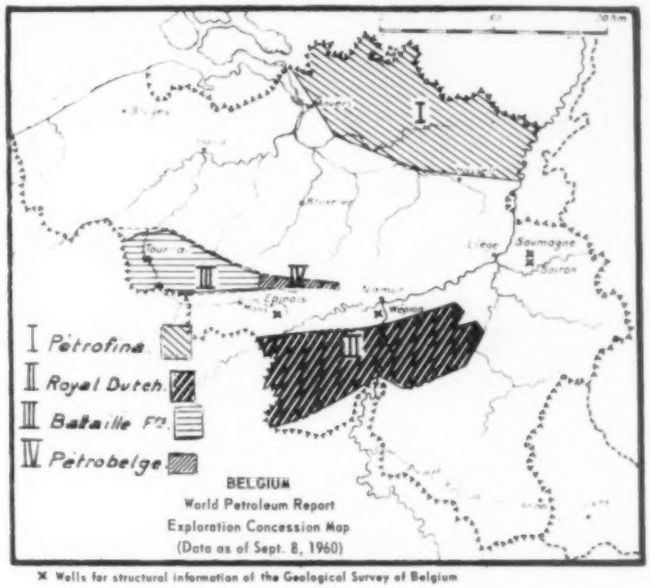
MARKETING: Inland consumption of all petroleum products in Belgium rose in 1959 by 6% to 5,950,000 tons, including a rise in

A decree which became effective September 1, 1960 by the Ministry of Economic Affairs requires all oil refiners and produce importers to store not less than 10% of their total market deliveries. Small importers were hard hit by this decree.

OIL LAWS

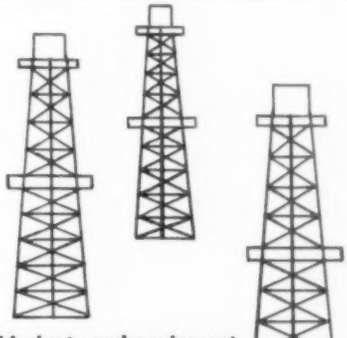
Tax incentives to encourage oil exploration are under study. A bill now before the Belgian senate would tax-exempt a portion of exploration costs, provided an equal sum is invested within five years in productive plant or in shares of Belgian companies.

A detailed study of taxation of petroleum in Belgium has been prepared, and became available during early 1961 under the title *"International Taxation Series."* This series on petroleum taxation covers every type of tax imposed on petroleum operations in all other countries as well as Belgium. Marketing, refining, transportation, exploration, and production taxes are covered, with a separate study of each. For an example of one of these national studies (all are prepared in exactly the same format), readers are referred to the Colombia section of this 1961 issue of *World Petroleum Report*, i.e., the section entitled "Colombia—Petroleum Industry Taxation." Requests for information on the entire series should be addressed to *International Taxation Series, P. O. Box 1591, Grand Central Station, New York 17, N. Y.* END



✕ Wells for structural information of the Geological Survey of Belgium

Equipment for the petroleum field operation



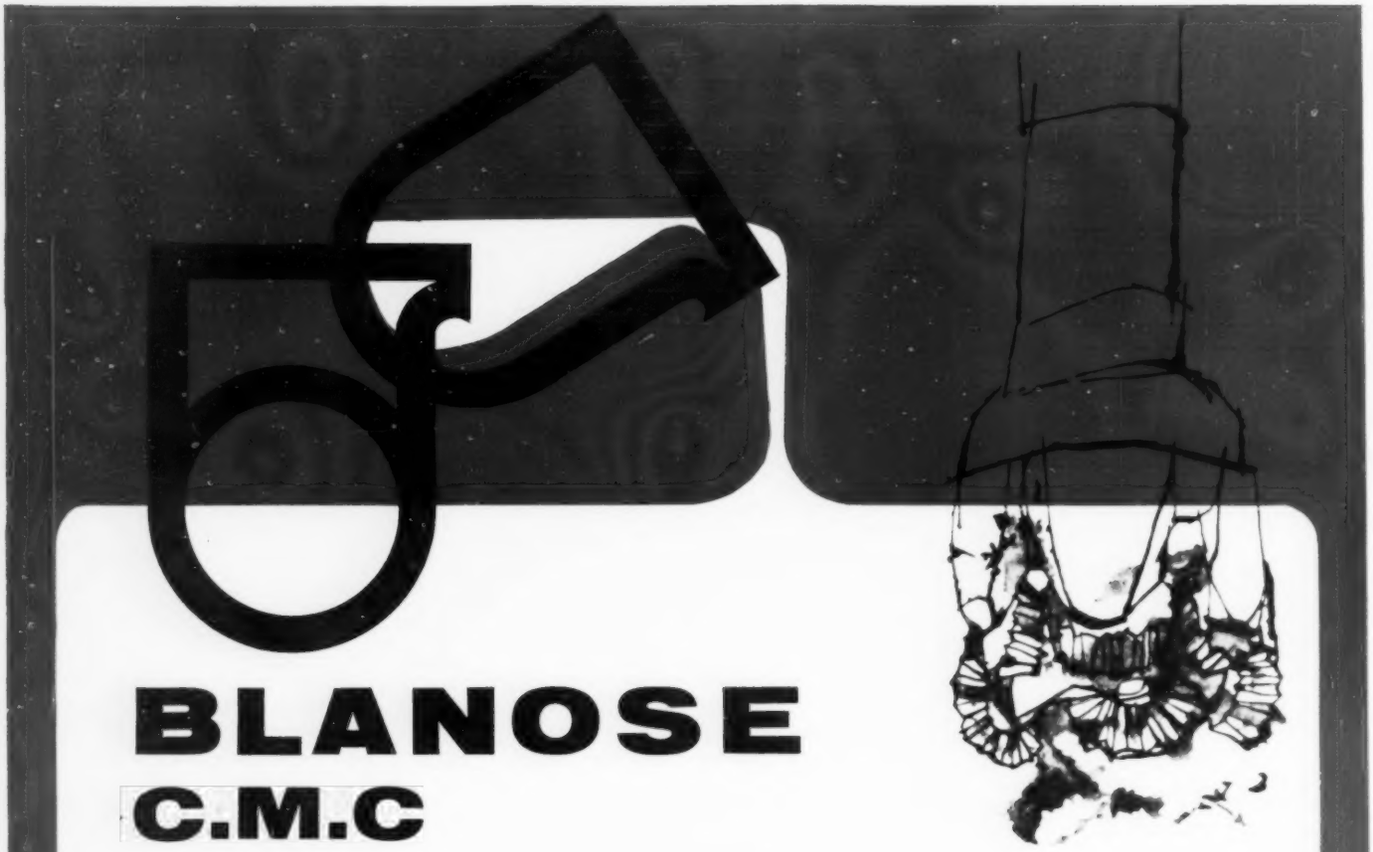
We design and build plants and equipment for the treatment of petroleum such as:

horizontal treaters
de-foamers
oil and gas heaters
oil-gas separators
well checkers

BMA

BRAUNSCHWEIGISCHE MASCHINENBAUANSTALT

BRAUNSCHWEIG WESTERN GERMANY · TELEPHONE 23691 · TELEPRINTER: BEMA BSWG 0952840



BLANOSE
C.M.C

A first class drilling mud additive

Four types for all requirements

BLANOSE B6S 510
Technical grade, low viscosity

BLANOSE BS 190
Technical grade, high viscosity

BLANOSE R 110
Purified grade, low viscosity

BLANOSE R 190
Purified grade, high viscosity (for low solids muds)

BLANOSE means safe, fast, easy drilling

Novacel

NOVACEL
6 rue Paul Baudry
PARIS - FRANCE

SYNERGIE 221-59

FRANCE

EXPLORATION IN 1960 (*Review by M. Levy, Bureau de Réchèrches de Pétroles*): In Aquitaine, there were no new developments during 1960. With the exception of development in the Cazaux fields—which went forward favorably with only two dry holes, four extension wells, and nine development wells—the areas of interest were reduced during 1960.

In the Paris basin, work during 1960 confirmed the petroleum possibilities of the Dogger and, to a lesser degree, those of the Neocomien in all the central part of the basin. Outside of a few shows, the Lusitanien did not fulfill the promise which had been made by the small shows of oil in well Villemer 101.

Besides the encouraging results obtained from development of fields in the Coulommes-Vaucourtois, the Chailly-Chatrettes, Villemer and Saint-Martin de Bossenay, a number of shows and some small production were obtained in various exploration wells, principally in zones neighboring those fields mentioned. The most striking results were obtained by COPESEP in its Aube-Yonne permit, where the Avon la Pleze and the Gisy les Nobles wells were put on production. In the regions of Fontainebleau-Nemours and on the Dammartin permit, CEP and PETROREP have, in addition, had some good shows, especially in the Aufferville and Nantouillet wells. On the other hand, systematic exploration work in the Sens-Chateaurenard region has uncovered some other productive levels, especially the Griselles sands, at the base of the Neocomien, at Saint-Firmin des Bois, and a fractured limestone of the Sequanien at Sens.

Exploration activity maintained a fast pace in 1960 with the expiration of the Etampes permits held by CEP, the Sancerre and Montargis permits (FROPEX), the Dammartin (PETROREP) and, at the year's end, the perimeter of the Aube-Yonne permit of COPESEP. On the other hand, the delay in handling applications on the surrendered areas by RAP, as well as on the Chartres application, held up work during most of the year in these two regions.

In Alsace, exploration activity dropped during 1960 with only four wells studying the possibilities of the Teritary in lower Alsace. In this series, the impregnated quartzite was penetrated by the Oberseebach 1 well, and some small production (about 7 cu meters per day, equivalent to 44.1 b/d) was obtained. The extension well to this discovery, Oberseebach 2, was not crowned with success. Principal activity was in geological and geophysical reinterpretation during the year.

During 1960, RAP drilled three exploration wells in Limagne, in the northern half of its Gannat permit. These wells penetrated the Tertiary series completely and reached metamorphic rocks to the complete exclusion of any Permian or Carboniferous layers. Reservoirs encountered in the Tertiary were filled with sweet water, sometimes with a slight mixture of carbonated gas.

In the Jura-Bresse-Chablais-Savoie-Couloir Rhodanien areas, no discoveries were made during 1960. Exploration work during the year concentrated on more precise definition of various exploration problems.

Esso Rep Operations in 1960:[1] 1960 was a new record year for Esso Standard SAF and Esso Rep. The results for all activities—production, transportation, refining, marketing—are distinctly above 1959 figures.

Esso Rep's crude production for 1960 is estimated at approximately 27,000 b/d. Most of this production was obtained from the Parentis oil field, discovered in 1954 in Esso Rep's exploration permit in the Bordeaux area. Three other oil deposits were discovered by Esso Rep in same area: at Mothes in 1955, at Lugos in 1956, and at Cazaux in 1959.

The distinctive feature of the year was the fast development of the Cazaux oil field. A dozen wells were in production at the end of the year. At that time, the field was producing at the rate of 3,500 b/d. It is expected this rate will reach 6,000 b/d when the development is completed. This deposit has been connected with the Parentis-Ambès crude pipeline.

In 1960, 22 wells were drilled in the various Esso Rep permits. This figure includes 14 development wells, 7 exploration wells, and the deepening of a former well. The total depth drilled during the year was 55,500 meters, including 28,000 meters of exploration drillings and 27,500 meters of development drillings.

Two new exploration permits were granted to Esso Rep in June and July 1960. One covers 2,072 square kilometers in the southeast of France (Languedoc area) in the Hérault and Gard Departments. Esso Rep entered into an association agreement with Cie. d'Exploration Pétrolière to carry on exploration in this permit. The other permit, in the eastern part of France, covers 1,520 square kilometers of the Ardennes and Marne Departments, and was granted to Esso Rep jointly with Cie. d'Exploration Pétrolière. Another exploration permit application was filled by Esso Rep in August 1960. This permit is not yet granted.

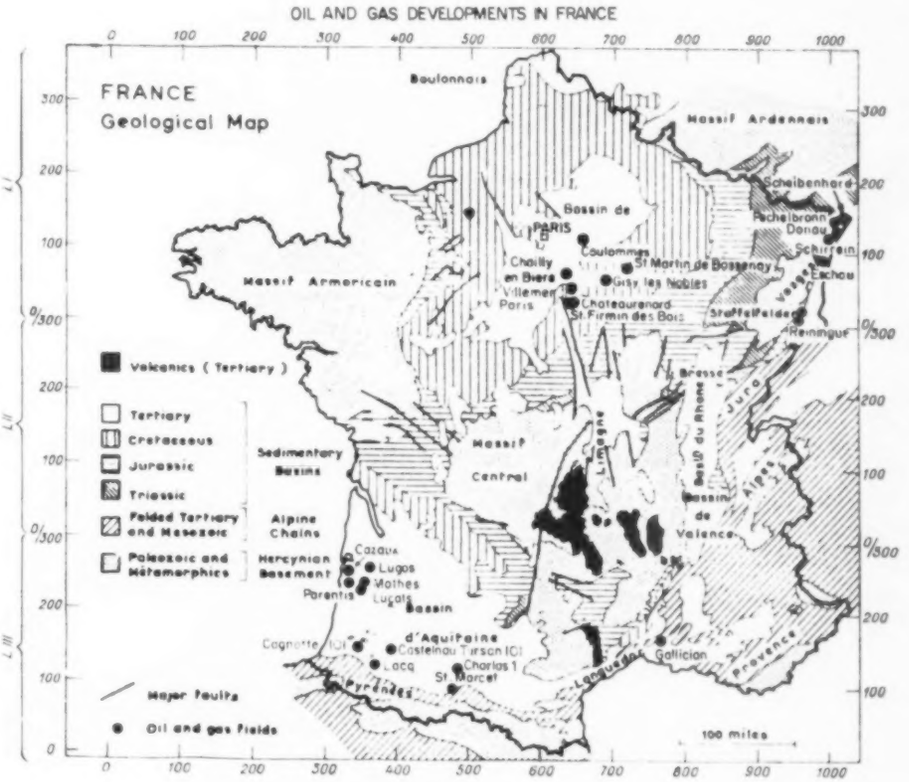
Tonnages of crudes received in 1960 at the Port-Jérôme and Bordeaux refineries were about 10% over previous year's figures.

Due to the introduction of Saharan crude into France, the pattern of Esso Standard's supplies was changed so that imports from Middle East and Venezuela dropped to 57.7% in 1960 from 66.8% in 1959. Percentages of crude receipts split by origin as follows:

FRANCE—Crude Received by Esso Rep

	1960 %	1959
Middle East	46.3	57.6
Venezuela	11.4	9.2
Indigenous	28.9	27.3
Sahara	11.3	—
Others	2.1	5.9

[1] Summary by Esso Rep.

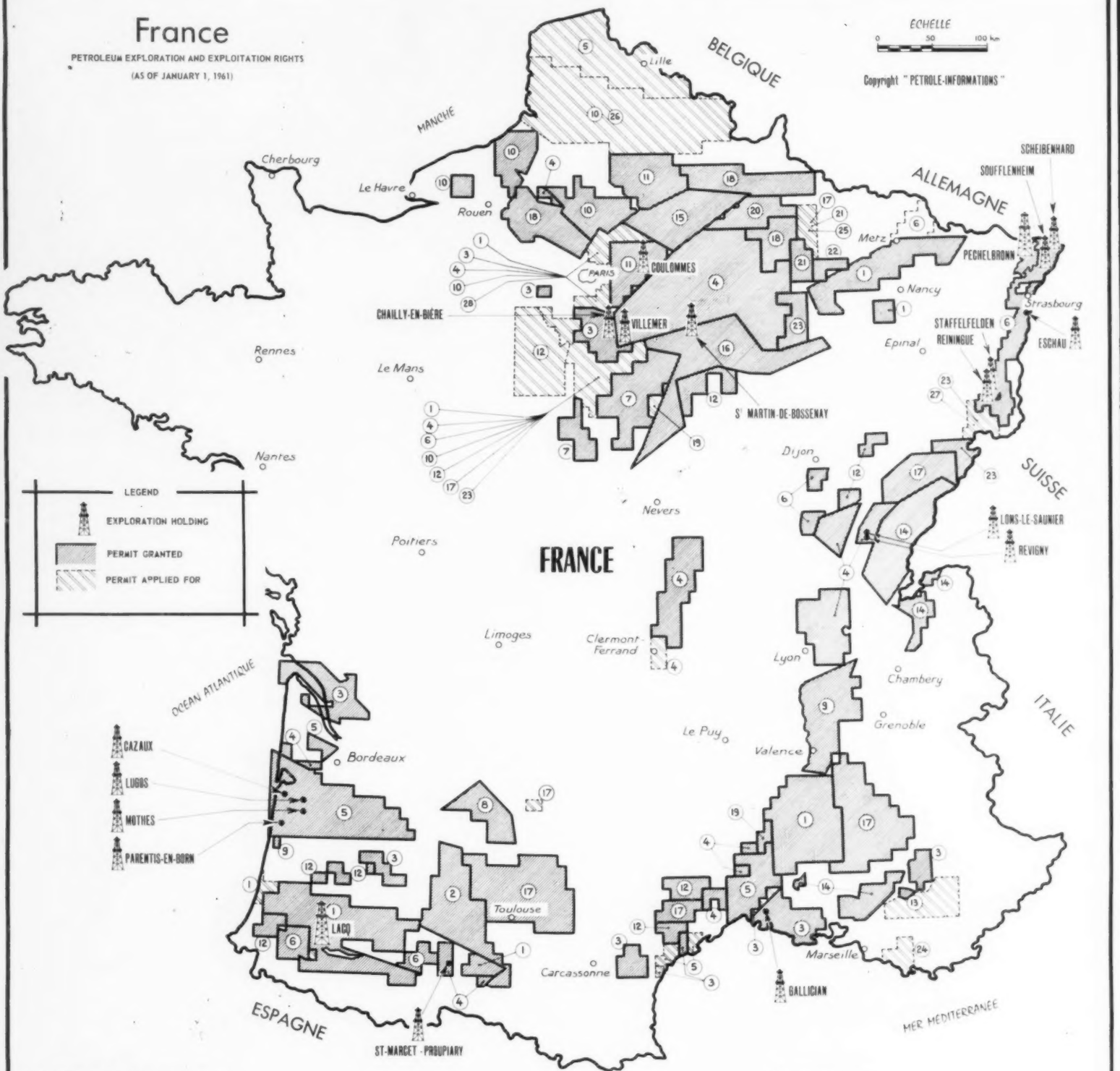


France

PETROLEUM EXPLORATION AND EXPLOITATION RIGHTS

(AS OF JANUARY 1, 1961)

Copyright " PETROLE-INFORMATIONS "



1. S.N.P.A. - Sté Nationale des Pétroles d'Aquitaine
2. S.P.G. - Société des Pétroles de la Garonne
3. C.E.P. - Compagnie d'Exploration Pétrolière
4. R.A.P. - Régie Autonome des Pétroles
5. ESSO-R.E.P. - Esso-Standard S.A.F.
6. PREPA - Sté de Prospection et Exploitation Pétrolière en Alsace
7. FROPEX - France Outremer de Prospections et Exploitations Pétrolières
8. C.P.G. - Compagnie des Pétroles de Guyenne
9. S.P.V. - Société des Pétroles de Valence
10. C.F.P.(R) - Compagnie Française des Pétroles (Normandie)
11. PETROREP
12. SAFREP - S.A. Française de Recherches et d'Exploitations Pétrolières
13. SIREP - Sté Independante de Recherche et d'Exploitation du Pétrole
14. PREPA - TRANSWORLD PETROLEUM
15. MOBIL-OIL-REPSA
16. COPESEP - Cie des Pétroles du Sud-Est Parisien
17. COPEFA - Cie des Pétroles FRANCE-AFRIQUE
18. PREPA - PETROREP
19. OMNIREX - Omnium de Recherches et Exploitations Pétrolières
20. ESSO-R.E.P. - C.E.P.
21. EURAFREP - Sté de Recherches et d'Exploitation de Pétrole
22. COPAREX - Cie de Participations, Recherches et Exploitations Pétrolières
23. FRANCAREP - Cie Franco-Africaine de Recherches Pétrolières
24. REPSUD - Société de Recherches Pétrolières du Sud
25. PETROFLEG
26. SHELL FRANÇAISE - PRODUITS CHIMIQUES ET RAFFINERIES DE BERRE
27. SOPREX - Sté Pétrolière de Recherche et d'Exploitation
28. B.P. - Sté Française des Pétroles B.P.

Service cartographique Louis CASTAN 604

FRANCE—National Oil Investment Program
(Millions of New Francs)

		1959
Exploration		770
Extension and development		405
Equipment		620
Pipelines*		540
Miscellaneous		95
	Total	2,430
		1960
Exploration		854
Extension and development		352
Equipment		573
Pipelines*		530
Miscellaneous		141
	Total	2,450

* Exclusive of Lacq lines, which are the responsibility of Gaz de France. In 1959 these totaled 343 million new francs; in 1960, they will have totaled 116 million.

Total crude runs at the Port-Jérôme and Bordeaux refineries amounted to about 103,000 b/cd, approximately 11% over 1959 figures.

The Port-Jérôme refinery processed about 71,000 b/d and Bordeaux refinery about 32,000 b/d. Thus, 90% of the total capacity of both refineries was utilized.

As concerns new projects, an additives plant (additives for lube oils) was put into service in April 1960 at the Port-Jérôme refinery. In the same refinery, a lube hydrofiner and an aromatics plant are under construction. The completion of these two plants is foreseen for the third quarter 1961 and for the first half of 1962 respectively.

Esso Standard's deliveries of all products to civilian consumption is estimated, from provisional figures, to be 11% to 12% above 1959 deliveries.

Esso Standard's position on the French civilian oil products market is in the range of 14.5% (End of Esso Summary).

French Oil Investment: The national program of oil investment in the franc zone in 1959 and that budgeted for 1960 are given in an accompanying table (in millions of new francs).

The French government unveiled plans during 1959 for a new State-owned company to engage in marketing along with private concerns. Originally the name was to be Ste. Industrielle des Pétroles, but it was later changed to Union General des Pétroles. The Caltex holdings in France form the cornerstone of the company's holdings. BRP, the French government's exploration agency, is not included in the owners of UGP; however, all the participants are owned, at least in part, by the government. Participants include Régie Autonôme des Pétroles, 35%; SN REPAL, 30%; four other State companies—Cie. d'Exploration Pétrolière-CEP, Ste. des Pétroles d'Afrique Equatoriale, Ste. de Production et d'Exploitation Pétrolière en Alsace (PREPA), and Ste. Nationale des Pétroles d'Aquitaine—together 35%. UGP will form a new company in which it will hold 60% and Caltex SAF 40% to operate the refinery, tankers, and marketing network taken over from Caltex (about 3% of the total market).

PRODUCTION: During 1960 production averaged about 36,900 b/d, most of it from the Parentis field of Esso, and the remainder from a number of smaller fields. Production in the Paris basin has continued to rise. This area is well situated with regard to markets, sitting in the industrial heart of the country.

Metropolitan France contains four areas which have been the subject of geological and geophysical activity: the Rhine graben, the Rhone valley, the Paris basin, and the Aquitaine basin.

The Rhine graben historically is one of the oldest oil-producing areas in Europe. Unfortunately, the oil fields which have been found have not supported the hopes for the area, and interest has subsided. The Rhone River valley

FRANCE—Principal Wildcats Drilled, 1960
(BRP Data)

BASIN	WELL NAME	BRP COORDINATES L	X	Y	Z	DEPTH (METERS)	BOTTOMED IN:	OBJECTIVE	COMPANY	REMARKS
Paris Basin	Asnières 1	I	580.621	139.334	29.5	1.959	Paléozoïque	Dogger—Lias Trias	C.E.P.	Dry
	Courtenay 1	II	651.541	333.351	168	620	Portlandien	Néocomien-Purbeckien	C.E.P.	Dry
	St-Firmin-des-Bois 1	II	644.740	327.775	169.5	610	Portlandien	Néocomien-Purbeckien	FROPEX	Oil Producer
	Auffreville 3	I	617.277	55.663	106	1.736	Dogger	Dogger	C.E.P.	Oil Shows
	Sens 1	I	676.896	55.717	136.5	1.657	Lias	Dogger—Séquanien	FROPEX	Oil Shows
	Perthes 3	I	612.393	83.250	82	1.709	Dogger	Dogger	C.E.P.	Dry
	Belloy 3	I	642.505	134.445	142.5	2.161	Domérien	Dogger Lias—Trias	PETROREP	Oil Shows
	Nantouillet 1	I	627.925	144.385	112	2.459	Primaire	Dogger	PETROREP	Oil Shows
	Montlevon 2	I	647.910	135.670	169.5	1.944	Dogger	Dogger	PETROREP	Oil Producer
	Avon-la-Pèze 1	I	696.069	78.057	165	1.590	Dogger	Dogger	COPESEP	Oil Producer
	Grisy-les-Nobles 1	I	669.490	64.350	90	1.765	Lias	Néocomien Lusitanien Dogger	COPESEP	Oil Producer
	Vaillant-St-Georges 1	I	715.039	86.128	105	1.394	Dogger	Lusitanien—Dogger	COPESEP	Oil Shows
	Soucy 1	I	673.363	62.075	106	1.718	Lias	Néocomien Lusitanien—Dogger	COPESEP	Oil Shows
	Aillant-sur-Tholon 1	II	673.991	320.015	153	1.124.5	Lias	Néocomien Lusitanien—Dogger	COPESEP	Oil Shows
	Esbly 1	I	678.725	141.280	128.5	2.875	Keuper	Dogger Lias inférieur?	R.A.P.	Oil and Gas Shows
	Montmirail 102	I	684.840	127.125	169	1.837.5	Dogger	Dogger	R.A.P.	Oil Shows
	Guignicourt 1	I	718.188	195.750	98	1.792.5	Trias	Lias inférieur?	SNPA/REPGA	Dry
	Mortefontaine 1	I	656.380	182.345	150.5	2.406	Trias	Jurassique	SNPA/REPGA	Dry
Jura	Chemin 1	II	827.350	225.000	186	684	Kimméridgien	Jurassique—Crétacé	SAFREP	Dry
	Eternoz 1	II	879.180	229.590	521	2.500	Permien	Lias—Trias	COPEFA	Dry
	Laveron 1	II	892.650	203.400	1.080	2.485	Trias	Jurassique—Trias Primaire	PREPA- TRANSWORLD	Dry
Aquitaine	Mimizan-Nord 1	III	311.118	223.483	11.3	2.764	Jurassique supérieur	Albo-Aptien Néocomien	ESSO-REP	Oil Producer
	Charlas 1	III	467.115	103.999	361.7	3.602	Lias moyen	Base Crétacé sup. Anté-Cénomanien	R.A.P	Gas Producer
	Estibeaux 101	III	337.824	152.978	57.9	4.735.5	Portlandien	Eocène—Crétacé Jurassique sup.	S.N.P.A.	Dry
	Salles 1	III	335.162	133.448	135	3.420	Kimméridgien	Crétacé inférieur Jurassique	PREPA	Oil and Gas Shows
	Soustons 1	III	313.000	168.060	43.6	1.928	Séquanien	Albien—Néocomien	R.A.P.	Dry
	Trensacq 1	III	358.492	216.609	93.5	3.377.5	Trias	Jurassique moyen Infralias	ESSO-REP	Dry
	Casteinau-Tursan 101	III	378.244	153.434	85.3	3.488	Portlandien	Crétacé inférieur Jurassique sup.	S.N.P.A.	Oil Shows
	Losse 1	III	406.096	199.736	138.5	2.701	Ordovicien	Secondaire-Primaire	C.E.P.	Gas Shows
	Poullie 101	III	331.305	150.905	41.3	2.809.5	Kimméridgien	Crétacé inférieur Jurassique sup.	S.N.P.A.	Oil Shows
	Bazas 1	II	400.300	243.150	99.1	2.730	Trias	Jurassique moyen Infralias	ESSO-REP	Dry
South East	Villidieu 1	III	815.825	223.735	265.8	1.975	Urgonien	Crétacé sup.—moyen	S.N.P.A.	Dry
	Villeneuve-de-Berg 1	III	772.365	254.400	365.2	2.758.5	Socle métamorphique	Mésozoïque	S.N.P.A.	Dry
	Montagnette 1	III	789.560	175.890	11	1.791	Kimméridgien	Jurassique	PREPA	Dry
	Marsanne 1	III	800.983	260.448	164.8	5.015.5	Lias supérieur	Crétacé inférieur Jurassique sup.	S.N.P.A.	Dry
	Lonol 1	III	813.640	199.420	56.4	951	Barrémien	Urgonien	S.N.P.A.	Dry
	Pont-de-Mirabeau 1	III	867.510	158.960	232	1.799	Trias	Dogger Base du Lias.	PREPA	Dry

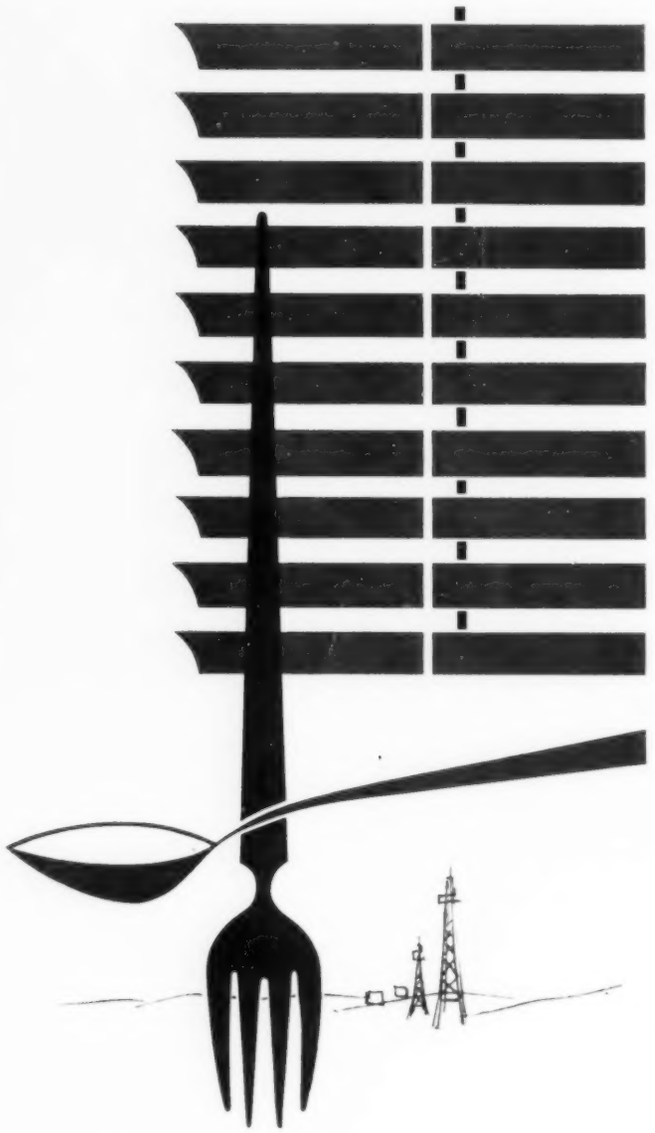
During the next decade, you'll see
more and more of Core Lab's professional touch
in field, laboratory, and consulting work
throughout the Free World.

CORE LAB

CORE LABORATORIES, INC.

BOX 10185 DALLAS 7 TEXAS USA • CABLE ADDRESS CORELAB

sahara...



CSH will resolve all your hotel problems in the Sahara.

Full details on request.

SAHARA HOUSING AND HOTELS COMPANY

Compagnie Saharienne d'Habitation et d'Hôtellerie

ALGIERS: 60 Bd Saint-Saëns—Phone 63.41.14
PARIS: 14, Avenue de l'Opëra—Phone: OPE 51-55

C S H

NEW
NEW
NEW
NEW
NEW

Martin-Decker Electric Drilloger Recording Systems

For the recording of Total Hook Load, Pump Pressure, Pump Speed, Rotary Speed, Torque, Rate of Penetration, and R. P. M. Signals, and Pressure Signals to 20,000 pounds . . . Write for Bulletin No. P90.

MARTIN DECKER

Write for descriptive literature
MARTIN-DECKER CORPORATION
3431 Cherry Avenue, Long Beach 7, California

The World's principal manufacturer of Oil Well Drilling Instrumentation

FRANCE—French Reservoir Data

Field and location (basin) Gas Fields	Date	Cum. prod. (bbl.) 4-30-60	Reserves, bbl. or cu. ft.*	No. of Wells	Gravity API	Prod. thickness (ft)	Type	Area (Acres)	Formation
Charlas (Aquitaine)	1960	Prod. test.	Unknown	1	—	56	—	Undev.	L. Cretaceous
Lacq Inferior (Aquitaine)	1951	158,000	6,300 billion	35	—	2,000	—	16,000	Neocomien
Saint Marcet (Aquitaine)	1939	—	10 yrs. add.	16	—	—	—	1,730	—
Oil Fields									
Bolwiller (Rhine Graben)	1957	Insig.	Insig.	1	—	131	Water dr.	49	Grande Oolithe
Cazeaux (Aquitaine)	1959	206,279	Under dev.	6	—	249	n. a.	Undev.	Albian, Aptien
Chailly en Biere (Paris)	1958	427,000	Under dev.	32	34.8	5-20	Water dr.	Undev.	Bathonian
Chateaurenard (Paris)	1958	168,800	n. a.	4	27.4	3-16	n. a.	740	Neocomian
Coulommes (Paris)	1958	1,703,000	30 M. M.	29	32.6	66	Water dr.	3,500	Upper Dogger
Eschau (Rhine Graben)	1956	140,000	185,000	7	—	163	n. a.	321	Grande Oolithe
Gallician (Rhone)	1951	n. a.	225,000	2	—	3-13	n. a.	n. a.	Olig., Eoc., Cret.
Lacq Superior (Aquitaine)	1949	24,000,000	3 M. M.	30	—	460	Water dr.	990	Senonian
Lucats (Aquitaine)	1956	Insig.	Insig.	1	—	153	Water dr.	98	L. Cretaceous
Lugos (Aquitaine)	1956	673,579	3.2 M. M.	6	—	153	Water dr.	533	L. Cretaceous
Mimizan (Aquitaine)	1960	7,000	Under dev.	1	11.3	n. a.	n. a.	Undev.	Albian
Montmirail (Paris)	1959	Insig.	Unknown	1	n.a.	n. a.	n. a.	Undev.	Dogger
Mothes (Aquitaine)	1955	1,217,000	3.5 M. M.	4	n.a.	75	Water dr.	480	L. Cretaceous
Parentis (Aquitaine)	1954	40,763,000	135 M. M.	29	n.a.	1,145	Water dr.	7,420	L. Cretaceous
Pechelbronn (Rhine Graben)	1866	25,000,000	Virtually depleted	n.a.	n.a.	n. a.	n. a.	n. a.	Various
Renigue (Rhine Graben)	1955	—	—	3	n.a.	66	Water dr.	200	Rauracien
Saint Firmin des Bois (Paris)	1960	Testing	Unknown	1	n.a.	n. a.	n. a.	—	Neocomian
Saint Martin de Bossenay (Paris)	1959	500,000	15 M. M.	9	33	200	n. a.	Undev.	Dogger
Scheibenhard Inferior (Rhine Graben)	1956	250,000	300,000	6	n.a.	6	Water dr.	250	Sannoisien
Scheibenhard Superior (Rhine Graben)	1956	300,000	670,000	11	n.a.	17	Water dr.	250	Stampien
Schirrhein (Rhine Graben)	1954	35,000	Depleted	2	n.a.	7	Water dr.	170	Sannoisien
Soufflenheim (Rhine Graben)	1954	220,000	Depleted	12	n.a.	7	Water dr.	420	Sannoisien
Staffelfelden (Rhine Graben)	1951	400,000	Depleted	2	n.a.	130	Water dr.	120	Grande Oolithe
Villemer (Paris)	1959	60,000	Under dev.	5	31.5	40	n. a.	Undev.	Bathonian-Dogger and Lusitanean

also has failed to show great promise. The Paris basin has regained the interest of the companies, however. In February 1958, PETROREP (Société Pétrolière de Réchèrches dans la Région Parisiènne) completed the Coulommes 1 CS for the first Paris-basin commercial production; the field has 29 producing wells including the 21 BF potentialed at 5,000 b/d.

In 1958, Coulommes was followed by discoveries at Chailly-en-Bière, Brie, and Chateaurenard; in 1959, at Montmirail, Saint Martin de Bossenay, and Villemer; in 1960, at Saint Firmin des Bois, Righy la Nonneuse, and Gisy les Nobles.

In the Aquitaine basin, the discovery history has been older (Saint Marcet was discovered in 1939), and more continuous (Lacq Superior in 1949, Lacq Inferior in 1951, Parentis in 1954, Mothes in 1955, Lucats and Lugos in 1956, Charlas and Cazaux in 1959, and Mimizan in 1960).

Lacq Inferior gas reserves are 6,300,000 mmcf recoverable, and Parentis crude-oil reserves are 135,000,000 bbl recoverable.

Crude Prices: Prices for crude oil have been fixed for the Paris basin crude (Chailly type), f.o.b. Le Havre, at $3.00 per barrel. For comparison, price of Hassi Messaoud crude, f.o.b. Bougie port, was set at $2.77 per barrel; and Pointe Clairette crude, f.o.b. Port-Gentil, on Africa's west coast, was set at $2.00 per barrel. These differences are caused by differences in the density of the crude concerned, and even more affected by their location and transport costs.

Reserves: Proved, recoverable reserves in metropolitan France are estimated by the government at 25,700,000 metric tons as of January 1, 1961. This is equivalent to approximately 173,989,000 bbl (using a conversion figure of 6.77 bbl per metric ton).

Natural Gas: In 1954 the only domestic source of natural gas was RAP's St. Marcet field, which produced 268 million cubic meters. The national output in 1959 was nearly 10 times as much—2,614 million cubic meters, of which 2,295 million came from the Lacq field, which made its first contribution to the market in April 1957. Sales of the purified gas rose in the past five years to 1,322 million cubic meters from 251 million; the pipeline network now covers a large part of France, though preference in the purchase of the gas is being given to the industries in the south. Sales of gas from the Lacq field are expected to reach their maximum of 13 million cubic meters a day in 1961 to give a total output of about 4,000 million cubic meters.

Development work by the producing company, Ste. Nationale des Pétroles d'Aquitaine (SNPA), has now been largely completed. The Lacq field is one of the biggest in the world, with a high yield per well—only 25 wells have had to be completed—and with proved reserves of 160,000 million cubic meters, but has abnormal sulfur content.

TRANSPORTATION: Agreement has been concluded and engineering has commenced on the South European pipeline project being undertaken for the Société due Pipe-Line Sud-European (SPLSE). With a length of 465 miles (750 kilometers), the pipeline will pass through France from Lavéra, a port city on the Mediterranean near Marseille, to the German border and beyond, serving two refineries near Strasbourg and two near Karlsruhe. The 30- to 34-in. line is to be designed to transport initially 200,000 bbl per day (10 million tons annually) of crude oil. Capacity is to be expanded eventually to 600,000 b/d. The Bechtel and OTP companies are responsible for the engineering design of the line. SPLSE is a consortium of oil companies comprising Antar Pétroles de l'Atlantique, Bataafse Petroleum Maatschappij, British Petroleum Co., Caltex SAF, Cie. de Raffinage Shell Bèrre, Cie. Française des Pétroles, Cie. Française de Raffinage, Deutsche Erdöl AG, Gelsenberg Benzin AG, Mobil Oil AG, Mobil Oil Française, Purfina Française, Scholven-Chemie AG, Société Française, Sholven-Chemie AG, Société Française des Pétroles BP, Standard Oil Co. (New Jersey), and Wintershall AG. At the head of SPLSE is C. A. Lambert, president, and H. Debrabant is general manager.

REFINING: The French refining industry has been steadily expanded in recent years. The 14 refineries now in service have a total distillation capacity of about 37½ million tons a year (831,700 b/d), which compares with a capacity of under 27 million tons five years ago, and of about 8 million just before the war. A capacity of 43 million tons is the objective for the end of 1961, and there is a tentative target of 54 million for 1965. In recent years, however, all the plants have not been fully utilized, the crude throughput having risen by no more than 29% in the five years under review, from under 24 million to nearly 31 million tons annually. The refinery yield pattern has shown little change over the five years. The share taken by gasoline has declined slightly, to 22% from 24%, and that of gas-diesel oil to 12% from 15% of the total output. Conversely, the yield of fuel oil has shown a minor increase to 50% from 48%.

Petrochemicals: In the period 1955 to 1959, the production of petrochemicals in France went up sevenfold, to 260,000 tons from 37,000, —raising the country's share in the West European total to over 21%. French capital investments in petrochemical facilities have been stepped up by $225 million (NF 1,100 million) to be expended on new plants due for completion by late 1961. The country's aggregate potential for making chemicals from petroleum will then be around 370,000 tons a year, in terms of carbon content.

Petrochemicals received a strong impetus from the domestic chemical industry, but equally important factors have been the rapid expansion of domestic oil refining facilities, and natural-gas supplies from metropolitan France and the Saharan regions. Vast reserves of natural gas in the Lacq area have made the establishment of associated chemical facilities imperative on technical grounds. Because this gas is exceptionally sulfurous, it must first be freed of most of its sulfur before it can be distributed. Besides 74% methane, gas at Lacq contains about 15% of hydrogen sulfide.

MARKETING: Inland consumption of petroleum products in France has doubled during the past eight years, but the rate of growth has slackened considerably since the Suez crisis. For

Where in the world are you going fishing?

Wherever you are, whatever your fishing problem — there are BOWEN FISHING TOOLS designed for your particular and special needs.

All tools needed for fishing — Overshots, Spears, Junk Catchers, plus the subsurface accessory items — Hydraulic Jars, Bumper Subs, Safety Joints, Internal Cutters, External Cutters, etc. — are available from BOWEN, world specialists in fishing tools.

Planning a rig? Going overseas? Drilling at home? Your Bowen man . . . domestic, Canadian or export . . . can plan and prescribe a complete line of fishing and accessory tools custom made for your operation.

Send for complete technical literature!

For over 25 years—the world's leading manufacturer of fishing and specialty tools.

BOWEN ITCO, INC.

P. O. Box 4587
Houston 13, Texas, U.S.A.
Cable Address: ITCO

BOWEN

FRANCE—Petrochemical Companies

Company	Plant Location	Basestock	Main Products
Cie. Francaise de Raffinage (C.F.R.)	Gonfreville	Refinery Gas	Olefins and derivatives; polyethylene; isobutylene; detergent basestocks; lube additives; sulphuric acid.
	La Mède	Refinery Gas	Propylene oxide; aromatic derivatives.
Société Nationale des Pétroles Aquitaine (S.N.P.A.)	Lacq	Natural Gas	Sulphur; ammonia; urea; plasticizers; polyethylene (from ethane extracted from natural gas).
Shell-St. Gobain	Petit-Couronne	Petroleum Wax	Detergent basestocks.
	Berre	Refinery Gas and Petroleum Fractions	Solvents; detergent basestocks; lube additives; alcohols; resins; insecticides; carbon black.
Shell-Berre	Berre	Refinery Gas	Olefins; sulphur.
Esso Standard	Port Jérôme	Refinery Gas and Petroleum Fractions	Olefins and derivatives; butadiene; isobutylene; dodecyl benzene; lube additives.
Naphtachimie (S.F.-BP and Péchiney)	Lavéra	Petroleum Fractions	Ethylene derivatives; polyethylene; polyesters; solvents.
Antar Pétroles de l'Atlantique	Donges	Petroleum Fractions	Olefins; aromatics.
Société de Caoutchouc Butyl (Group of oil, chemical and rubber companies)	Port Jérôme	Isobutylene (from C.F.R. and Esso Standard)	Synthetic Butyl rubber.

three years before, consumption had risen by a steady 12% a year, but it declined fractionally in 1957; it rose by 11% in 1958, but by only 5% in 1959. The increase was of 46% for the five years as a whole. This compares with an expansion of 74% in the United Kingdom and of 180% in West Germany—which in 1959, for the first time, consumed more oil than France. Bunker sales at French ports show little net increase during these years, a rise in fuel oil being roughly offset by a fall in gas-diesel oil.

The growing use of fuel oil domestique—the product with the fastest rising demand—is offset by the steep increase (126% in five years) in jet-fuel consumption. The changeover from aviation gasoline to turbine fuels has, however, been slower in France than in some other European countries, and aviation-gasoline requirements continued to increase quite steeply until 1959.

The growth of consumption of fuel oil has been much less striking than in most countries of Western Europe. Heavy fuel-oil consumption was actually consumed in slightly smaller quantities in 1959 than in 1956. Bitumen sales show an average increase, recovering sharply in 1959. Consumption of lubricants showed a not unsatisfactory increase of 30% in the five years.

Imports of crude have been stepped up from 23.6 million tons in 1954 to 29.2 million in 1959. The Middle East (Iraq, Kuwait, Qatar, Saudi Arabia, and Iran, in that order) is, of course, by far the most important source, but its share in French imports has fallen slightly to 85% from 93% since 1954. Over 8% of crude-oil imports came from the Caribbean in 1959. The franc zone provided no more than 5% of last year's crude imports, but its contribution will increase rapidly from now on in view of the projected increase in Saharan production and the growing quantities to be expected from Gabon and the Middle Congo, and metropolitan France. According to latest estimates, crude production in the whole franc zone will rise from 11.5 million in 1960, to 22 million in 1961, and to some 26 million in 1962 (about 502,000 b/d).

Though quality consideration may limit the proportion of Saharan oil which can be treated in French refineries, the government's intention is that the latter shall use as much franc oil as possible. With the impetus to economic expansion which membership of the European Common Market is bringing, the country's oil requirements will doubtless continue to mount rapidly during the next few years; and oil self-sufficiency is now within sight.

FRANCE—Refinery Throughput and Output
(Thousands of Metric Tons)

	1954	1954 % of output	1959	1959 % of output	% Increase
Distillation capacity	26,810	—	37,440	—	40
Crude throughput	23,838	—	30,766	—	29
Output of saleable products	22,009	—	27,625	—	26
OUTPUT OF SALEABLE PRODUCTS:					
Butane and Propane	402	2	862	3	114
Gasolines	5,369	24	6,127	22	14
White spirit	46		67		46
Kerosine and Jet fuel	788	4	1,153	4	46
Gas/Diesel oil	3,329	15	3,206	12	—4
Fuel oil	10,529	48	13,801	50	31
Lubricants	464	2	611	2	32
Bitumen	1,001	5	1,253	5	25
Other products	81		545	2	573
Total	22,009	100	27,625	100	26

Source: Comite Professionnel du Petrole.

OIL LAWS

For a detailed and highly recommended study of French petroleum-industry legislation and regulation, the editor highly recommends *Petroleum Legislation*. This is a legislative reference service containing a summary and analysis of the oil laws and other industry regulation for every major country of the world. The national section for France is prepared by legal counsel recommended by oil companies who operate within France, and the same oil-law firm keeps its review up-to-date by loose-leaf revision service. For information on this excellent service, the publisher may be contacted directly at: *Petroleum Legislation Ltd., P.O. Box 1591, Grand Central Station, New York 17, N. Y.*

NATIONAL FACTORS

Taxation rates are unusually high, as the accompanying review of taxation indicates. Combined with unusually high operating costs in the country, operations are anything but cheap. The attractive interior market, however, makes discoveries of small size commercial—particularly when near the heavily industrialized section surrounding Paris.

Labor costs are relatively very low, less than one-third USA levels, and a pool of competent labor is available.

FRANCE—Consumption of Petroleum
(Thousands of Metric Tons)

	1954	1955	1956	1957	1958	1959	% Increase During 1955/59
INLAND							
MOTOR GASOLINE							
Standard	2,492	2,680	3,029	3,369	3,351	3,444	38
Premium	1,282	1,550	1,453	998	1,471	1,601	25
Total	3,774	4,230	4,482	4,367	4,822	5,045	34
L.P.G.	340	416	516	584	711	809	138
Aviation Gasoline	119	126	160	182	205	199	67
Industrial spirits	87	95	109	108	107	115	32
Kerosine and jet fuel	158	182	208	198	203	225	42
Gas oil	1,328	1,500	1,554	1,435	1,503	1,564	18
FUEL OILS							
"Domestic"	1,141	1,407	1,913	2,285	3,052	3,498	206
Light	1,381	1,628	1,889	1,805	2,177	2,210	60
Heavy	4,627	4,849	5,397	5,162	5,356	5,290	14
Total	7,149	7,884	9,199	9,252	10,585	10,998	54
Lubricants	380	421	479	475	459	494	30
Bitumen	724	861	941	978	915	1,043	44
Other Products	66	93	97	98	93	86	30
TOTAL Inland	14,124	15,807	17,745	17,676	19,602	20,577	46
BUNKERS							
Gas oil	79	87	102	99	119	73	— 8
Diesel oil	341	278	277	208	258	243	—29
Fuel oil	1,211	1,363	1,620	1,360	1,540	1,336	10
Lubricants	18	20	20	21	22	22	22
TOTAL Bunkers	1,649	1,748	2,019	1,688	1,939	1,674	2

Source: Comite Professionel du Petrole.

48 m3 (1,700 cu. ft.) container conveying goods from Algiers to Hassi-Messaoud.

ATELIERS de CONSTRUCTIONS
FRIGORIFIQUES TROPICALES

Louis ZHENDRE

A

TERREFORT

VILLENAVE-D'ORNON

(GIRONDE)

(ROUTE DE TOULOUSE Km 8,900)

Phone: 44.78.67 Boroleaux

Telegram:

ZHENDRE-BORDEAUX (France)

— ALGIERS Plant

— DAKAR Plant

— ABIDJAN

— HASSI-MESSAOUD

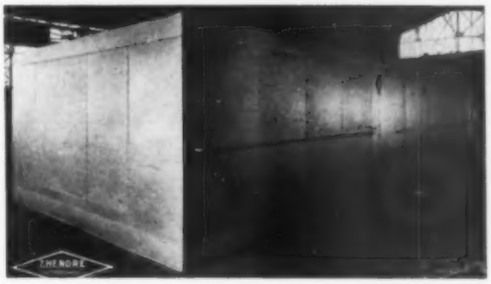
REFRIGERATION FOR TROPICAL AREAS

600 TYPES OF UNITS IN PRICE LIST

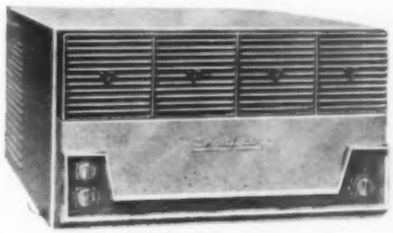
- Refrigerating vans.
- Refrigerating containers for —30° C at +70° C (—22° F. at 158° F.).
- Isothermal containers from 1—100 m3 (35—3,500 cu. ft.).
- Isothermal containers for air shipments.
- "Cooler" Cold Chambers (all-metal) can be disassembled for ships or dismountable for any use.
- Brousse stationary refrigeration lockers.
- Iso-Brousse cross-country refrigeration lockers.
- Portable ice plants from 10—10,000 kg. (22—22,000 lbs.).
- Ultra-light African cross-country "Frigo" lockers.
- Metallic iceboxes, all sizes.
- Tropical household refrigerators.
- Refrigerating units for gasoline (petrol) or electric operation.
- ZENITH-AIR "Tropical" and "Sahara" Air Conditioners.

Some of our references:

Compagnie de Recherches et d'Exploitations au Sahara.
S. N. Repal (Algeria).
SEREPT (Tunisia).
Compagnie Francaise des Petroles.
Compagnie des Petroles d'Algerie (Shell).
Societe Languedocienne des Forages Petroliers.
Societe des Petroles du Senegal (BP).
Societe des Petroles d'A.E.F.
Compagnie Generale de Geophysique.
INTERFOR (Libya).
Inspection Technique des Subsistances militaires.
Entrepose:
a.s.o. (full list on request)



100 m3 (3,500 cu. ft.) "Cooler" cold-room for —20° (—4° F.).



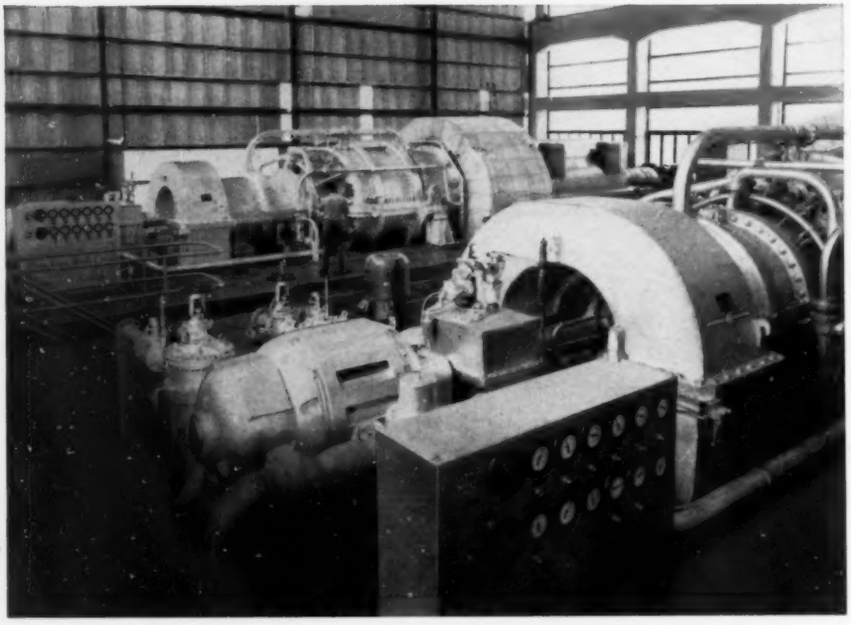
Tropical air-conditioner ZENITH-AIR.

CONSULT US ON YOUR REFRIGERATION PROBLEMS

CATALOGUE ON REQUEST **Rapid Estimates and Deliveries**

For every phase of petroleum operation—

SAVE TIME AND MONEY IN SERVICE WITH DEPENDABLE



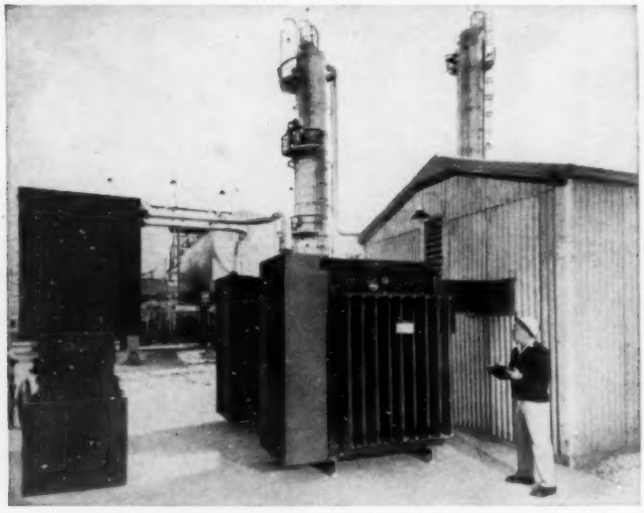
POWER COSTS ARE REDUCED by these self-contained, compact General Electric gas turbines. Units are basically rugged machines, simple in design, with no reciprocating parts, and require little maintenance. G.E. offers a wide range of gas turbines from 5,000 to 21,800 kilowatts.

G-E Engineered Electrical Systems Provide Maximum Production Efficiency ... Increased Power For The Future

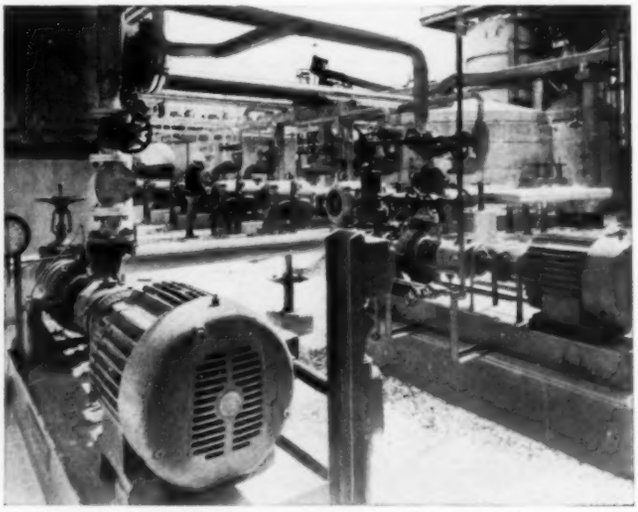
Increased output in today's petroleum operation often depends on the efficiency and dependability of the complete electrical system. General Electric's broad experience in the petroleum field can help you fill your equipment needs—and provide important engineering services as well.

When a complete system is needed, experienced G-E application engineers will work with you or your consulting engineers at the *planning* stage. Later, project engineers will coordinate selection, delivery, and installation of the G-E equipment. The result: a G-E engineered electrical system that is designed to give you maximum efficiency on present production requirements ... plus built-in capacity to serve tomorrow's needs.

For help in designing an efficient electrical system for your plant, contact your nearest General Electric representative, or fill in the coupon on the opposite page and mail to: *International General Electric Co., Dept. 22-11, 150 East 42nd Street, New York 17, N.Y., U.S.A.*



RELIABLE G-E TRANSFORMERS perform the final step-down to motor and lighting voltages. General Electric distribution transformers are easy to install and easy to maintain. Available in all standard types and ratings from 3 to 500 kva.

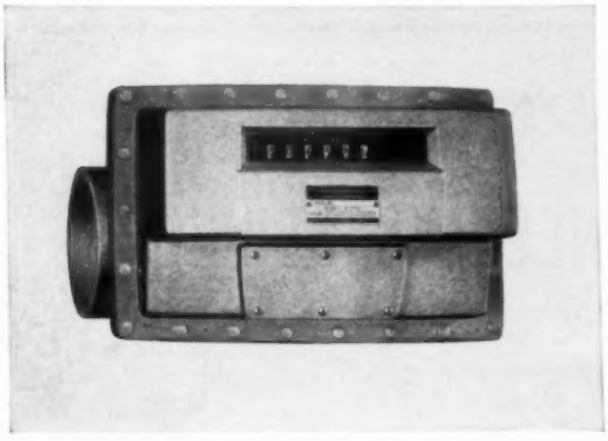


RUGGED, TOTALLY-ENCLOSED and explosion-proof General Electric Tri-Clad® '55' motors provide extra protection and greater safety required for some refinery applications. More reliable Tri-Clad motors require less maintenance, reduce system shutdowns.

PLANNING...INSTALLATION AND GENERAL ELECTRIC EQUIPMENT

GREATER EFFICIENCY AND ECONOMY result from easy-to-install G-E motor control sectional distribution center, providing centralized control of all processing motors from a central location. Compact design saves valuable floor space.

KING-SIZED General Electric compressor motors are controlled by 4160-kv, metal-clad switchgear. Co-ordination with reliable General Electric motor control centers provides complete selective tripping for the electrical system.



NEW G-E TRUE MASS FLOWMETER ACCURATELY MEASURES FLOW OF LIQUIDS, GASES, AND LIQUEFIED GASES... *DIRECTLY IN POUNDS!*

The new General Electric Type LB gyro-integrating mass flowmeter measures fluid flow by actual mass—independent of variations in pressure, temperature, density, and other physical properties of the gas or liquid. This new instrument completely eliminates the time consuming necessity of converting volume to weight with the associated possibility for error.

The new G-E flowmeter is completely self-contained and includes four basic components: (1) flowrate sensor; (2) gyro-integrating mechanism; (3) cyclometer register; and (4) contact device.

SEND FOR HELPFUL LITERATURE ON GENERAL ELECTRIC PRODUCTS

International General Electric Company
Department 22-11, 150 East 42nd Street
New York 17, N.Y., U.S.A.

Please send me complete information on the G-E products checked below:

- ☐ G-E Gas Turbines
- ☐ G-E Transformers
- ☐ G-E Tri-Clad* '55' Motors
- ☐ G-E Motor Control Unit
- ☐ G-E Switchgear
- ☐ G-E True Mass Flowmeter

Name_____

Title_____

Company_____

Address_____

City_____ Country_____

*Registered trade mark.

Progress Is Our Most Important Product

GENERAL ELECTRIC

—U.S.A.—

On January 1, 1960, the "nouveau franc" replaced the old franc. Its value is 100 times the old, divisible into 100 centimes, each of which is worth one old franc. The NF (nouveau franc) is quoted in New York at the bank-note rate of approximately 20 US cents per NF.

French Government Policy: The institution of a State-owned marketing company, UGP (reviewed in a previous issue this report) had a considerable impact on the companies operating in the country. They feared the government might continue to expand its operations, using the advantageous position it has as a national concern, and their fears appear well founded, since it was announced early in 1961 that UGP had signed a preliminary agreement with La Mure, a small distributor of oil and coal. La Mure has about 400 filling stations, as well as a network of distribution facilities for fuel oil and products which will be taken over by a joint affiliate of UGP-La Mure, each holding 50% interest. Since Caltex already has about 3% of the French market, and UGP took over Caltex holdings in its original formation, this would increase their market share to around 4%. La Mure's toehold includes about 1% of the heavy fuel market, 2.52% of light fuel, 1% of the gasoline market, and 3.4% of the gas-oil market.

The formation of UGP infuriated the venerable CFP (Cie. Française des Petroles), which has considerable (35%) government ownership itself and had carried out a successful expansion of its marketing facilities in France and elsewhere. The acquisition of La Mure is not calculated to soothe these feelings, since La Mure in the past has been supplied with products from CFP.

For a review of the composition of UGP (which is 40% Caltex, 60% French), see *World Petroleum Report 1960*, p. 193.

The French government maintains extremely strict controls over all petroleum operations, from exploration through marketing. Refinery quotas are fixed, for example, and companies can only refine their quotas. This serves to fix the market, and restricts competition severely, since any company seeking to increase its share of the market in excess of its refinery quota has to buy the additional supplies from one of its competitors—usually not a profitable process. It limits prices wars too, since there is no point in competing for the market and, as a result, French oil prices are quite high. The earnings on the profits from oil prices offset, to some degree, the extremely high costs and taxation in France.

For a review of taxation, please refer to the summary in this report. It is part of a worldwide oil-tax study series, published in early 1961 by *International Taxation Series, P.O. Box 2744, Grand Central Station, New York 17, N. Y.*

FRANCE
PETROLEUM INDUSTRY TAXATION*

This review covers oil-industry taxation in production (including exploration), transportation (pipeline), refining, and marketing.

The monetary unit of France is the new franc (NF). The exchange rate is approximately 4.90 NF per U.S. dollar or 20.40 U.S. cents for one NF. The areal unit of measure used in France is the hectare, equivalent to 2.47104 acres, equivalent to 10,000 square meters.

*Review by Louis Coignard, Asst. Tax Manager, Esso Standard S.A.F., Paris.

Production

Taxation of production and exploration operations in metropolitan France is as follows (a special tax régime being provided for in the O.C.R.S., i.e., Common Organization for Saharian Regions, as mentioned separately hereafter).

Most of tax provisions in the producing field are embodied in the French Mining Code enacted by Decree 56-838 of August 16, 1956.

SURFACE TAXES—*Decree of October 17, 1957:* Surface taxes: State Tax amounts to 0.40 NF per hectare. However, exempton is granted to the producer if the amount of exploration expenses (less depreciation) incurred during a given year is at least equal to the amount of the tax for the same year.

SUBSOIL TAXES—*Mining Code, Articles 37, 39, 40:* Due by the concession holders only, and equal to 5 NF per hectare.

EXPLORATION COSTS—*Non-Exploitation Properties—Decree 47.2051 of October 22, 1947:* Exploration costs are treated as organization expenses and can be charged to an expense account, either directly or through amortization.

ROYALTIES—*Crude Oil—Domestic Production—Mining Code, Article 31:* Concession holders are liable to a royalty, the rate of which is fixed for each concession and different for crude oil and gas. This royalty is based on the value of the petroleum products at the well head: (*Continued on page* 66)

COMPAGNIE FRANÇAISE D'ÉTUDES ET DE CONSTRUCTION

TECHNIP

4, Avenue de Bois-Préau - Phone: 967-11-10
RUEIL-MALMAISON (S.-&-O.) - FRANCE

ALL ENGINEERING SERVICES

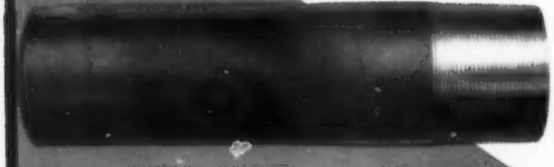
- Petroleum
- Petrochemical
- Chemical
- Atomic energy

70

70 years

of pioneering in steel pipe and tubes

API casing, tubing, drill pipe, line pipe
Casing and tubing integral joints
Carbon and alloy steel pipe for oil refineries
Kindly refer to the composite catalog *(pages 1376 A-D)*



- Agents all over the world
  and in the U.S.A. :
- THE CRISPIN COMPANY
  Suite 123 Oil and Gas Building
- Houston 2 (Texas)
  O.C.T.G. Stocks in Texas and Louisiana

FBT

PARIS

COMPTOIR FRANCO-BELGE D'EXPORTATION DES TUBES D'ACIER

23-27 Avenue de Neuilly - PARIS (16') France • Cable Address : Tubacier - Paris • Telex : Tubacie - Paris 27076

Crude oil:

from	0 to	50,000 tons/year	..exemption
from	50,000 to	100,000 tons/year	.. 6%
from	100,000 to	300,000 tons/year	.. 9%
from	300,000 to	1,000,000 tons/year	.. 12%
above	1,000,000 tons/year	.....	14%

No royalty is paid on crude oil consumed in operations.

Gas:

from 0 to 300 million cubic meters/year..exemption
above 300 million cubic meters/year 5%

No royalty paid on gas consumed in operations.

ROYALTY PAYMENT—*Mining Code, Article 32:* In kind or in cash at the government's option, payable to the Mine Administration ("Service des Mines") within the jurisdiction of which oil or gas field is located.

MUNICIPAL AND DEPARTMENTAL PRODUCTION TAXES—*General Tax Code Annex I, Article 288 and Decree 59.1573 of December 31, 1959 and Decree of December 31, 1959:*

0.666 NF per ton of crude oil extracted.
0.2580 NF per 1,000 cubic meters of natural gas extracted.

No tax on oil or gas consumed in operations.

INCOME AND ASSOCIATED TAXES—*General Structure—General Tax Code, Article 219 and Ordinance 58.1374 of December 30, 1958, Article 60/1:* The statutory rate of the French profit tax is 50%; a reduced 10% rate is provided for capital gains resulting from partial transfers of assets. These rates apply to taxation of companies.

INCOME TAX—*Basis—General Tax Code, Article 209 and Decree 48.1986 of December 9, 1948, Article 95:* Taxable income is based on gross income as per books, before income and associated taxes, less allowable deductions, certain booked being non deductible.

ALLOWABLE DEDUCTIONS—*General Rules—General Tax Code, Article 39:* General allowable deductions are described as those ordinary and necessary expenses incurred during the taxable year and which relate to the normal functioning of the business.

ALLOWABLE DEDUCTIONS—*Depletion Factor—Percentage Depletion Allowance General Tax Code, Article 39ter and Law 53.79 of February 7, 1953, Article 43:* Producers are allowed to constitute, free of tax, a reserve equal to a fixed percentage (27.50%) of the gross value at the well head of the crude oil extracted within a taxable year. This reserve is limited to 50% of the net profit deriving from production and from the first stage of processing in the case the crude or gas is processed in the producer's own refineries.

The tax exemption is granted provided such reserve is re-invested within 5 years from the fiscal year during which it was created, either in the way of fixed assets or research work for new discoveries of oil or gas deposits, or in the way of subscriptions to stocks issued by such companies devoted to exploration for and exploitation of oil or gas, as designated by the government. If not re-invested within this time limit, this reserve will be restored to the taxable profits of the fiscal year during which such 5-year period expires.

ALLOWABLE DEDUCTIONS—*Depreciation—Law 59-1472 of December 28, 1959, Article 37:* As from January 1, 1960, firms are allowed to use accelerated depreciation (declining balance method). From January 1, 1960 to January 1, 1965, they may opt between the declining balance method and an accelerated depreciation existing prior to January 1, 1960 (initial allowance and/or advance annuity).

ALLOWABLE DEDUCTIONS — *Revaluation of Fixed Assets—Ordinance 45-1820 of August 15, 1945 and Law 59-1472 of December 28, 1959:* Enterprises are allowed, under certain conditions, to revalue their fixed assets according to coefficients fixed by the government. This provision, which results for enterprises in additional depreciation allowances, will no longer be permitted as from December 29, 1962.

ALLOWABLE DEDUCTIONS—*Payroll Tax—General Tax Code, Article 231:* A 5% payroll tax is paid and borne by employers on salaries paid to their employees. This 5% tax rate is raised to 10% for the portion of yearly salaries between 30,000 and 60,000 NF and to 16% for the portion of yearly salaries over 60,000 NF.

ALLOWABLE DEDUCTIONS — *Trade Tax — General Tax Code, Article 1454 (11°):* Trade Tax: exemption.

ALLOWABLE DEDUCTIONS—*Municipal and Departmental Patrimony Real Estate Tax—General Tax Code, Articles 1381 and 1382:* Based on the rental value of rents and buildings fixed in accordance with the French local tax Authorities.

ALLOWABLE DEDUCTIONS—*Turnover Taxes—Ordinance 59.109 of January 7, 1959, Articles 4, 9, 10 and 12:* No turnover taxes or excise taxes on the sale of crude oil (Art. 4). A 10% turnover tax (tax on added value) is collected on the sale of gas (Art. 12). This tax is recoverable by industrial gas consumers.

Crude-oil or gas producers are allowed to recover the turnover taxes (tax on added value) they bear on exploration expenses and operating investments (Art. 9 and 10).

ALLOWABLE DEDUCTIONS—*Tax on Income—General Tax Code, Article 40, Decree 55.594 of May 20, 1955, Article 9 and Decree of August 4, 1960 and General Tax Code, Annex IV, Article 4 (a):* Capital gains are exempted from income taxes in the year of sale inasmuch as the enterprises undertake to reinvest within a 3-year period an amount equal to the available funds deriving from the sale in fixed assets. Fixed assets are defined as equipment, buildings, land, investments assuring at least 20% of the capital stock of a third enterprise (this percentage is reduced to 5% in the case of acquisition of stocks in the capital of French metropolitan or overseas companies whose object is the exploration for or exploitation of oil).

The capital gains reduce the book value of the newly acquired assets.

DIVIDEND TAX—*General Tax Code, Article 1 and Law 59.1472 of December 28, 1959, Articles 19 and 20:* Dividerds are subject to a 24% withholding tax assessed on the net profit distributed by a company. This tax is an advance payment on the income tax due by the dividend recipient (company or individual).

The 24% statutory rate may be reduced by bilateral tax treaties: 15% in favor of U. S. shareholders.

The 24% tax is reduced to 12% on interest on bonds.

UPSTREAM DIVIDEND TAX—*General Tax Code, Articles 216 and 145, and Law 59.1472 of December 28, 1959, Article 43:* In the case of affiliated companies, the mother company has to pay the 50% profit tax on the 1/4th of the net dividend received from its subsidiary. If the parent company redistributes the dividend received from the said subsidiary under certain conditions, it has to pay no dvidend tax on this redistribution. The degree of participation required to obtain this tax régime is normally 20%. No minimum degree is required in the case of participation in companes devoted to exploraton for and exploitation of oil with the approval of the French government.

Transportation (Pipeline), Refining, Marketing

Laws applicable to transportation operations (pipeline) and to refining and marketing operations are listed in this section. All the laws mentioned under production are not applicable to transportation, refining, or marketing operations, unless listed hereafter.

TRANSPORTATION TAXES *(Pipeline) — Ordinance 59.109 of January 7, 1959, Article 4:* No transportation tax on crude and finished petroleum products, as far as products using the pipeline are in bond: otherwise, transportation is subject to the 8.50% tax on services rendered.

CONSUMPTION TAX—*Customs Code, Article 265*

GROUP OPINIONS

Pipe Line Technologists, Inc. provides specialized professional engineering for every phase of oil, gas, chemical and products pipe line operation, from the initial market analysis and feasibility reports to the design, engineering, financial planning, supervision of construction and management of the completed project. The findings of these experienced, qualified, specialists in their field are coordinated by group action into conclusive reports and efficiently built and operated pipe lines.

The experienced personnel of Pipe Line Technologists can become or augment your own pipe line engineering and management staff.

PIPE LINE TECHNOLOGISTS, INC.

Professional Pipe Line Engineers

HOME OFFICE: 3431 West Alabama • P. O. Box 22146, Houston 27, Texas

Cable PIPETECH

New York Calgary The Hague Maracaibo Tehran

and Ordinance of January 7, 1959: Consumption tax, which includes excise tax and turnover tax, is levied once and for all on the finished petroleum products processed in French refineries when cleared, on a basis fixed by the French government, which is different for each category of petroleum products.

This tax is not recoverable by industrial consumers of petroleum products. Imported finished petroleum products are subject to customs duties in addition to the consumption tax.

INCOME AND ASSOCIATED TAXES—*General Structure—General Tax Code, Article 219 and Ordinance 58.1374 of December 30, 1958, Article 60:*
Transportation . . . the same as for production.
Refining and Marketing . . . the same as for production.

ALLOWABLE DEDUCTIONS — *General Rules — General Tax Code, Article 39:*
Transportation . . . the same as for production.
Refining and Marketing . . . the same as for production.

ALLOWABLE DEDUCTIONS — *Accelerated Depreciation — Law 59.1472 of December 28, 1959, Article 37:*
Transportation . . . the same as for production.
Refining and Marketing . . . the same as for production.

ALLOWABLE DEDUCTIONS—*Inventory Reserves —General Tax Code, Article 39 (1) (5°) and Annex III, Article 3 and subsequent articles:* Refiners can continue tax-free reserves aiming at covering the fluctuations in the cost of crude oil processed by them and quoted in international markets.

ALLOWABLE DEDUCTIONS—*Patrimony Tax—General Tax Code, Articles 1381 and 1382:*
Transportation . . . the same as for production.
Refining and Marketing . . . the same as for production.

TRADE TAX—*General Tax Code, Articles 1447 and subsequent:* A municipal and departmental trade tax is levied on commercial and industrial activities, and is determined according to the nature of activities carried on, the importance of investments thereof, and the number of employees; applicable to transportation, refining, and marketing operations.

ALLOWABLE DEDUCTIONS—*Payroll Tax—General Tax Code, Article 231:*
Transportation . . . the same as for production.
Refining and Marketing . . . the same as for production.

DIVIDEND TAX—*General Tax Code, Article 1 and Law 59.1472 of December 28, 1959, Articles 19 and 20:*
Transportation . . . the same as for production.
Refining and Marketing . . . the same as for production.

SAHARIAN REGIONS
Producing and Transportation

The Saharian tax legislation is the same that is in force in metropolitan France except for the following provisions:

ROYALTIES—*Crude Oil—Inland Production—Ordinance n° 58-1111 Art. 63:* Holders of mining titles are liable to a royalty determined by the application to the value of petroleum products at the well head of the following flat rates:

Crude oil	12.5 %
Gas	5.00%

INCOME TAXES—*General Structure—Base—Ordinance n° 58-1111 November 22, 1958 Art. 65:* The Saharian income tax is assessed at a 50% rate on the difference between the taxable profits as defined above under French metropolitan tax laws and the royalties, with an eventual possibility of carrying forward any excess of royalties over taxable profits against future profit tax liability of the producers.

TRANSPORTATION—*The 50% tax is assessed on the taxable profits deriving from transportation operations within Saharian regions (ibidem Art. 69) Ordinance n° 58-1111 of 1958 Art. 64:* Companies engaged in oil ventures in Sahara should create a seperate branch of accounting over there for their producing and transportation activities.

ALLOWABLE DEDUCTIONS — *Depletion — Ordinance n° 58-1111 November 22, 1958, Art. 64, VII, 8° and Art. 66:* Producers may constitute a depletion reserve within the limits similar to those provided for by the French metropolitan tax law, but such a reserve is taxed at 50% after a five-year period or when it is distributed to shareholders prior to 5 years.

TRANSPORTATION: Not applicable.

ALLOWABLE DEDUCTIONS — *Interests — Ordinance 58-1111 November 22, 1958 Art. 64 VII 4°:* An interest on borrowed capital is deductible if its rate does not exceed 8%, and in that case the borrowing firm is granted loans by its shareholders if the capital borrowed does not exceed the capital stock of the firm.

TRANSPORTATION: The same as for producing.

ALLOWABLE DEDUCTIONS—*Taxes other than Income Taxes—Ordinance 58-1111 November 22, 1958 Art. 67 II:* As the Saharian tax régime is based on the principle of 50/50 profit sharing between producers and State, any increase on the existing taxes (such as registration duties, indirect taxes, real-estate taxes . . .) over 150% of their amount in November 1958 would be deductible, first from 50% income tax and then from the royalties.

TRANSPORTATION: The same as for producing.

TAX EXEMPTIONS—*Dividend Tax—Ordinance 58-1111 November 22, 1958 Art. 67 and Ordinance 58-1113 November 22, 1958 Art. 1 and 2:* This 50% tax replaces all metropolitan French income taxes including the dividend tax on distribution of dividends deriving from producing activities in Sahara; in case beneficiaries of such dividends are French corporate bodies, the latter are exempt from any income tax thereon; they also are exempt from the dividend tax in the event of redistribution of those dividends to their own shareholders.

TRANSPORTATION: The same as for producing.

TAX EXEMPTIONS—*Turnover Taxes—Custom Duties—Ordinance 58-1111 November 22, 1958 Art. 67 III Art. 68:* Equipment and services connected with the producing activities are exempted from turnover taxes and custom duties in case equipment comes from French territories or from abroad, but in the only event it is proved it is impossible to obtain such an equipment within the French territories.

TRANSPORTATION: The same as for producing.

GUARANTEE FOR TAX STABILITY—*Ordinance 58-1111 November 22, 1958 Art. 70:* The stability of the present tax régime is guaranteed over the duration of about 25 years within a maximum of 30 years. END

***International Taxation Series**—The above review is taken from International Taxation Series—French (including OCRS) section, which is to be published in early 1961. The reviews cover all aspects of petroleum taxation in each major country in the same fashion as above. Provision has been made for keeping the series current by supplements and loose-leaf revisions. For information on the complete series, please address inquiries to International Taxation Series, Post Office Box 2744, Grand Central Station, New York 17, New York.*

NORWAY

EXPLORATION: The mainland of Norway has never been considered potential oil territory, and no exploration has been done. For the first time, however, exploration is taking place in Norway's far north islands. American Overseas Petroleum Ltd. applied to the Norwegian government early in 1960 for exploration rights in Spitsbergen. The Spitsbergen archipelago's oil possibilities are analogous to the Canadian Arctic Islands lease play, since Spitsbergen is geologically related to those islands. Pre-Cambrian and Caledonian mobile belts traverse these far northern islands, northern Greenland, and Scandinavia. Geology shows Carboniferous, Permian, Mesozoic, and Tertiary sediments lie above pre-Devonian rocks disturbed by Caledonian and older orogenies in Spitsbergen. Coal has been mined in Spitsbergen for many years from the Tertiary and Cretaceous. Some Carboniferous-age coal is found also.

Despite the archipelago's location above 70° 30′ north latitude, the west coast of the main island is ice-free much of the year because of the relatively warm North Atlantic drift (related to the Gulf Stream).

Shell group is also studying oil possibilities, with four geologists reportedly sent during 1960 to Spitsbergen.

PRODUCTION AND REFINING: There is no production of oil. A 40,000 b/d refinery was completed in 1960 for A/S Esso-Raffineriet Norge at Slagen. The only other plant is a 2,100 b/d skimmer, also owned by Esso.

MARKETING: The oil market is characterized by the high share of residual oils, which have more than doubled since 1950.

Norsk Braendselolje A/S, owned half by British Petroleum and half by Norwegian interests, handles about 40% of all sales, with Shell and Esso each handling about 25% and Mobil and Caltex most of the rest. Purfina has now also established a small marketing organization. Russian and Romanian petroleum products, mainly black oils, have made their appearance in the Norwegian market in recent years. The Russo-Norwegian trade agreement for 1959-61 foresees annual imports of 200,000 tons and the Romanian-Norwegian agreement, running for one year, some 120,000 tons.

MALTA

No concessions are known to be held for petroleum exploration. BP Exploration Co. (Malta) Ltd. gave up the search some time ago after drilling Naxxar 2, an exploratory well which was abandoned dry at 9,736 ft. in dolomite. Their concession was then relinquished and no exploration occurred during 1959 or 1960. END

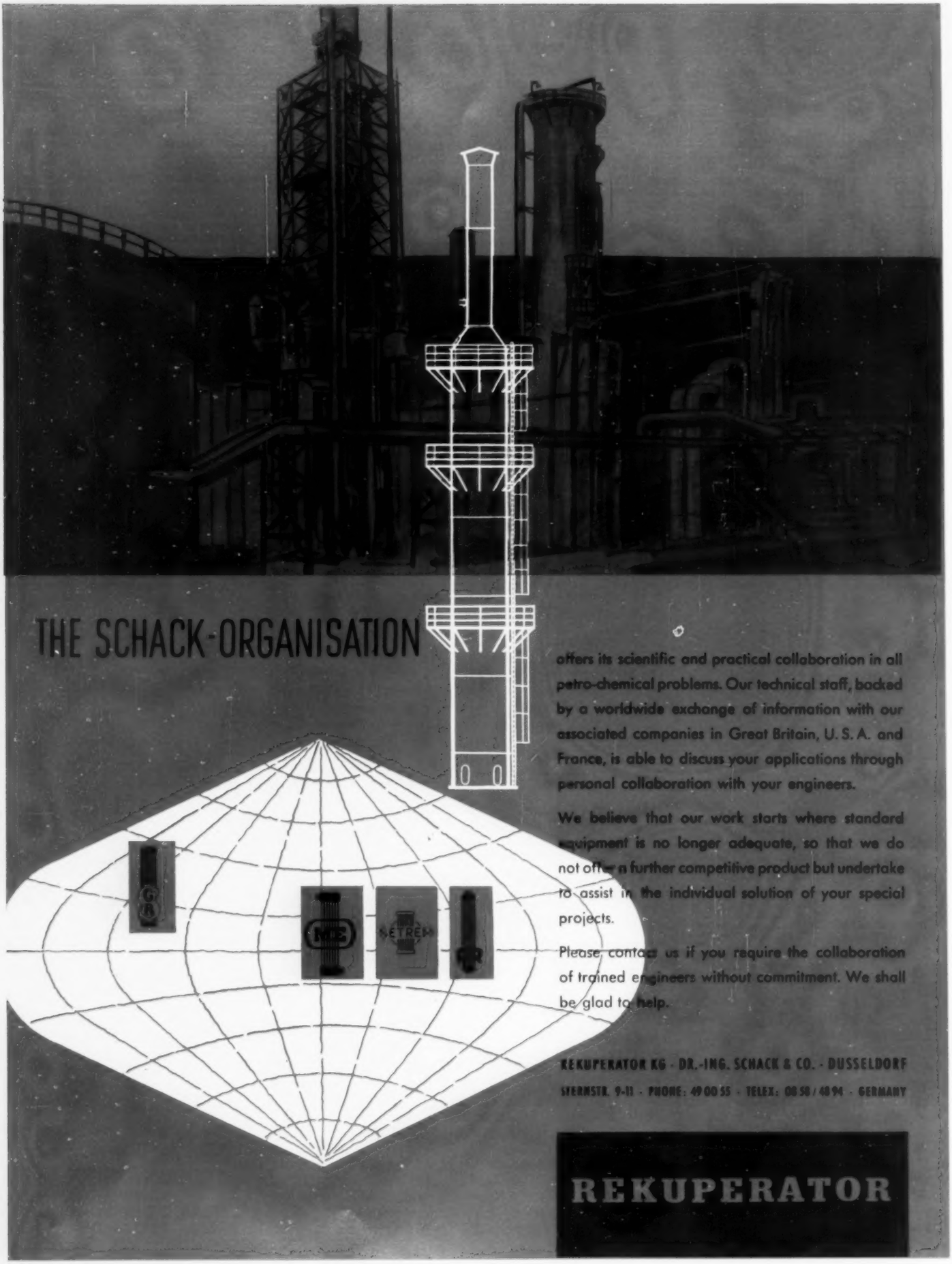
FINLAND

EXPLORATION AND PRODUCTION: There is no exploration being conducted, and no production of crude oil.

REFINING: The country's only refinery is a modern 18,500 b/d plant operated and owned by Neste Oye, a government company. It is located at Naantali.

OIL LAWS

For a review of oil laws see World Petroleum Report—1959, page 81. A translation of the oil laws of Finland is available through *Petroleum Legislation Ltd., Post Office Box 1591, Grand Central Station, New York 17, New York.* END


THE SCHACK-ORGANISATION
offers its scientific and practical collaboration in all petro-chemical problems. Our technical staff, backed by a worldwide exchange of information with our associated companies in Great Britain, U. S. A. and France, is able to discuss your applications through personal collaboration with your engineers.
We believe that our work starts where standard equipment is no longer adequate, so that we do not offer a further competitive product but undertake to assist in the individual solution of your special projects.
Please contact us if you require the collaboration of trained engineers without commitment. We shall be glad to help.
REKUPERATOR KG · DR.-ING. SCHACK & CO. · DUSSELDORF
STERNSTR. 9-11 · PHONE: 49 00 55 · TELEX: 08 58 / 48 94 · GERMANY
REKUPERATOR

GERMANY

Introduction: The outstanding success in the German oil and gas exploration during 1960 is the result of extensive exploratory drilling during the preceding years and the systematic interpretation of geophysical methods. Reflection seismic in particular, employing the latest instrumentation, gives a high degree of accuracy in the interpretation of the lower tectonics of all prospective basins. The discovery of new structures at the margins of deeper sedimentary basins as well as the classification and interpretation of the reflections is possible only with reflection seismic work. Of vital, if not decisive importance, is also the study of the paleogeographical situation in regard to the possible extension of the sediments and their facies. A steady advance of drilling technique contributed to success in 1960 and renders it possible to drill to depths of 4,000-5,000 meters and more.

Exploration:* Under these circumstances 1960 was again a good year for the German oil industry. The discovery of eight new oil fields, respectively—Reitbrook-West, Gr. Hamburg, Volkensen, Esperke, Aldorf SW, Loeningen SE, Meppen, and Velden; and of two new gas fields —Ratzel, Anzing—and the significant discovery of good oil shows in the Rhaetic sandstone at Well Markdorf-Oberteuringen in the western Molasse Basin are characteristic of the intensive exploration activity in this oil district.

Special importance is given the outstanding discovery of Dogger beta oil on the deep western flank of the saltdome of Reitbrook in southern Holstein and northeast of the Sottorf saltplug. In the Lower Saxonian Basin the discovery of the Bramhar-Wettrup field in the preceding year had a stimulating effect on exploration activity and resulted in the new discovery of the Meppen field (Upper Jurassic and Valendis pays). In the same area the discovery of rich gas bearing horizons in the Upper Permian in the preceding years stimulated drilling activity for natural gas.

Germany's prospective oil areas with good conditions for the formation of oil and gas deposits lie within three geological units: These are: 1. The Northwest German Basin; 2. the Graben of the Upper Rhine Valley; and 3. the subalpine area (Molasse Basin).

Due to intensified exploratory drilling during preceding years and the relatively small extension of the prospective areas it can be noted that the discoveries in 1960 have yielded eight new oil and two new gas discoveries only, as compared with 14 oil and seven gas discoveries in 1959. Most of the new oil and gas discoveries are related to previous oil or gas-bearing structures and can be regarded as extensions of producing fields.

Of the successful exploratory wells eight were drilled within the Northwest German Basin and two in the Molasse Basin. With the exception of the discoveries of Reitbrook W 3, Gr. Hamburg 12, Aldorf SW 1 and Meppen, none of the oil finds seem to be of particular importance.

*Review of exploration and production by Dr. E. Malzahn, Niedersächsisches Landesamt Für Bodenforschung, Hannover, Germany.

Germany's exploratory activity has increasingly been changed during the last two years in favor of prospective horizons in greater depths and discoveries of natural gas. Encouraging manifestations of natural gas have been found within some sandstones of the Upper Carboniferous in the center of the North-West German Basin, and in Rhaetic sandstones near the basement in the western part of the Molasse Basin. New stratigraphical and paleogeographical knowledge was the result of some deep wells of which well Hoya Z 1 attained 4,779.1 meters (15,675 ft).

The production of crude oil amounted to 5.5 million tons (approximately 107,970 b/d, using conversion factor of 7.129 barrels per metric ton), an increase of 7.3% over 1959.

TABLE I. GERMAN CRUDE OIL PRODUCTION (Metric Tons)

	1958	1959	1960*
1. North of Elba River	447,317	449,781	489,100
2. Between Elbe and Weser Rivers	1,538,713	1,865,437	2,007,400
3. Between Weser and Ems Rivers	951,526	1,142,960	1,326,000
4. West of Ems River	1,283,469	1,352,697	1,351,700
5. Upper Rhine Valley	149,242	178,140	213,700
6. Molasse Basin	61,329	113,743	142,100
	4,431,596	5,102,758	5,530,000

*Last month estimated.

Some Emsland fields of high productive capacity have restricted oil production due to limited capacity of refineries suitable for German crude oil.

TABLE II. SHARE OF PRODUCING REGIONS IN TOTAL PRODUCTION (Per Cent)

	1958	1959	1960
1. North of the Elbe	10.1	8.8	8.7
2. Between Elbe and Weser	34.7	36.6	36.8
3. Between Weser and Ems	21.5	22.4	23.3
4. Emsland District	29.0	26.5	24.6
5. Upper Rhine Valley	3.4	3.5	4.0
6. Molasse Basin	1.3	2.2	2.6
	100.0	100.0	100.0
Total production (million tons)	4.43	5.01	5.52

At present German oil production satisfies one fifth of the total West German consumption (28 million) only. The province between Weser and Ems rivers showed a particularly noteworthy growth in production with 1.32 million tons, as compared with 1.14 million tons in 1959.

The steady increase of wells drilled to search for natural gas in carbonatic beds of the Upper Permian (Zechstein) and in pre-saline formations resulted from the discovery of a potential gas producer, Ratzel Z 1, about 10 kilometers west of the Georgsdorf oilfield. Although some of these gas discoveries were shut in due to the lack of big consumer outlets and pipelines respectively, gas production increased to about 400 to 450 million cubic meters in 1960, as compared with 387,620,000 meters in the previous year.

Drilling, in meters, for 1960 decreased to a total of about 654,000* as compared with 752,865.52 meters in 1959 (Fig. 4). The permanent increase in average depth, such as from 1,686 meters in 1958 to 1,784 meters in 1959, shows the tendency to deeper exploration.

Development of fields discovered in 1958 and 1959 led to a remarkable increase in production in the fields of Ploen-Ost, Meckelfeld-Sued, Knesebeck, Hänigsen, Varel, Wehrbleck, Bramhar-Wettrup and Landau. There was active drilling in the Ploen-Ost (two successful extension, six production wells) and the Meckelfeld-Sued (six successful production wells) oil fields. The Knesebeck oil field was still not fully defined. Sixteen wells produced about 48,000 tons of oil in 1960. This type of oilfield, previously unknown in the Broistedt-Gifhorn trough, is formed by a mosaic of tilted fault-blocks between the salt domes of Vorhop and Schneflingen.

A remarkable increase in output of crude oil took place in the Hänigsen oilfield, where the discovery of oil in a deep downfaulted block in 1957 by the well Siegfried 57, led to the completion of 55 successful wells. 1960 production of the Hänigsen-Dachtmissen field has reached about 245,000 tons as compared with 52,600 tons in the older Nienhagen field.

The greatest drilling activity besides the Hänigsen oilfield was in the Bramhar-Wettrup field. In this field an oil of excellent quality is trapped in the Bentheim sandstone due to the gradation into a shaley facies. Since the discovery of the field by the wells Bramhar 2 and Wettrup 2 in 1958, 40 producing wells have been completed. In this field production in 1960 amounted to about 82,000 tons as compared with 30,294 tons in 1959.

Reserves: Total proved and prospective reserves as of January 1, 1960, have been estimated by the Niedersächsisches Landesamt für Bodenforschung, Hannover, at 72.9 mil. tons (See Table III) or 519.7 million bbls. This includes 57.9 million tons of proved reserves, as compared with 74.9 million tons total reserves of the previous year.

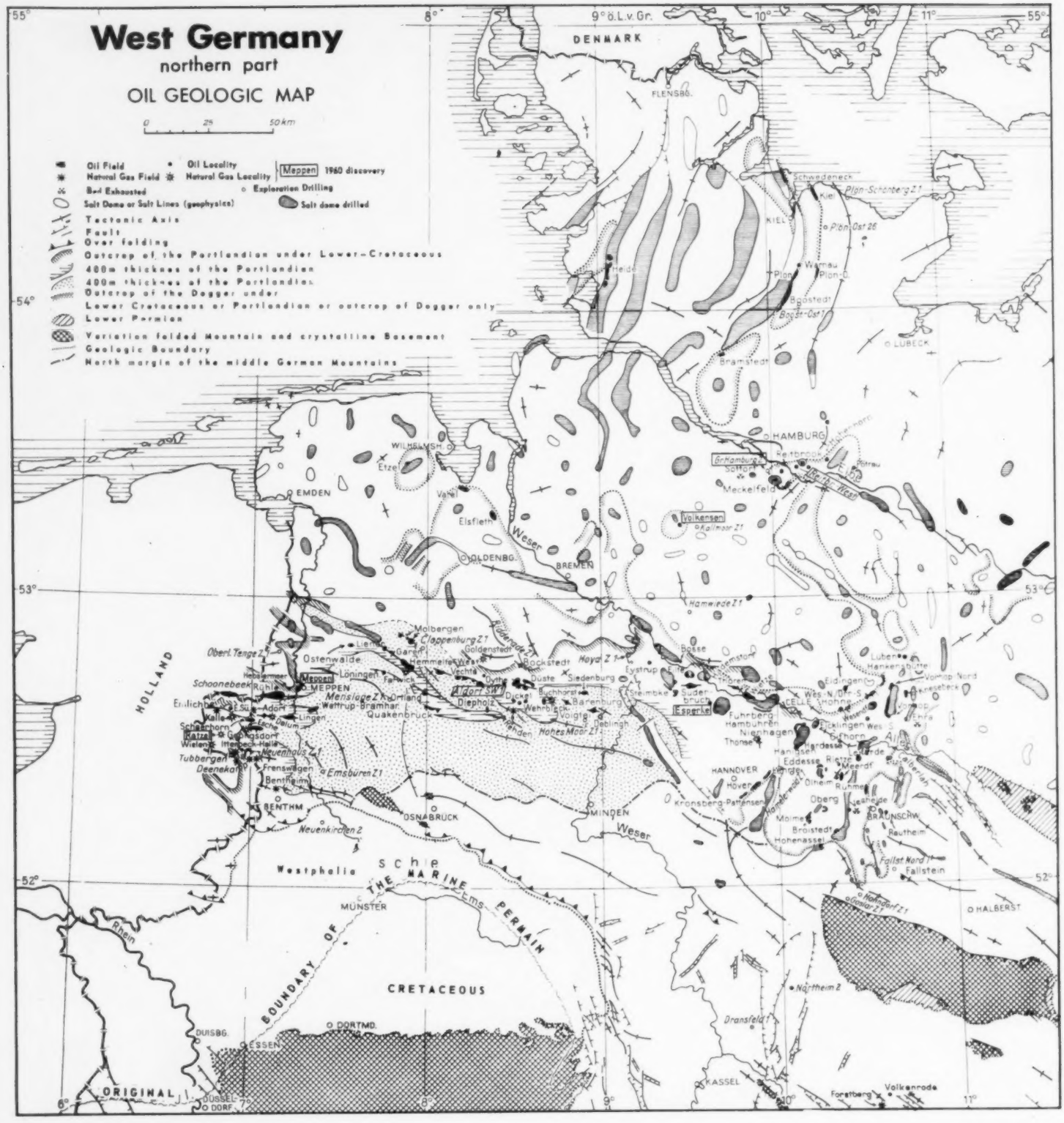
In the following report the reader is referred to the oil-geological maps and the stratigraphic section.

At present oil pays in West Germany are porous beds in the Lower Cretaceous (Valendis and Wealden), the Upper Jurassic Malm (Serpulite, Gigas beds, Kimmeridgian and Corallian oolithe), the Middle Jurassic Dogger (Sand-

*Last two months estimated.

TABLE III. DISTRIBUTION OF CRUDE-OIL RESERVES (METRIC TONS) As of January 1, 1959 and 1960

	Proved		Probable		Total	
	1959	1960	1959	1960	1959	1960
North of the Elbe	3,789	3,569	920	1,645	4,709	5,214
Between Elbe and Weser	20,837	19,941	4,071	3,994	24,908	23,935
Between Weser and Ems	14,190	16,175	6,591	4,816	20,781	20,991
Emsland District	15,980	15,650	4,540	3,520	20,520	19,170
Upper Rhine Valley	1,679	1,616	840	825	2,519	2,441
Molasse Basin	885	936	585	241	1,470	1,177
	57,360	57,888	17,547	15,041	74,907	72,929



stones in the Bathonian, Bajocian and Upper Aalenian), the Lower Jurassic Liassic (Angulaten- and Grenzsandstone), and some sandstones in the Rhaetic and Keuper (Upper Triassic).

The oil and gas bearing horizons in southern Germany are predominantly sands, sandstones or porous limestones in the Tertiary. Natural gas occurs in dolomitic beds of the Upper Permian (Zechstein) in some parts of northwest Germany. First gas finds were in the Buntsandstein (Lower Triassic) by several wells in the Emsland-district and in the area between Weser and Ems.

Exploratory Drilling: As in the past years, successful exploratory drilling was in the area of the known sedimentary troughs, the Sottorf Meckelfeld-Hohenhorn trough, and at the northern and western margin of the Lower Saxonian basin. The discovery of oil and gas in the subalpine basin during the last years led to increased drilling activity in 1960. Here one gas and two oil discoveries only were made.

Area North of the Elbe River: In the area north of the Elbe River drilling activity was restricted to two wells on the eastern border of the East Holstein Jurassic trough and two wells in the deep trough-like basin from the Meckelfeld oilfield north to the salt diapyr of Hohenhorn. All exploratory wells investigated Jurassic

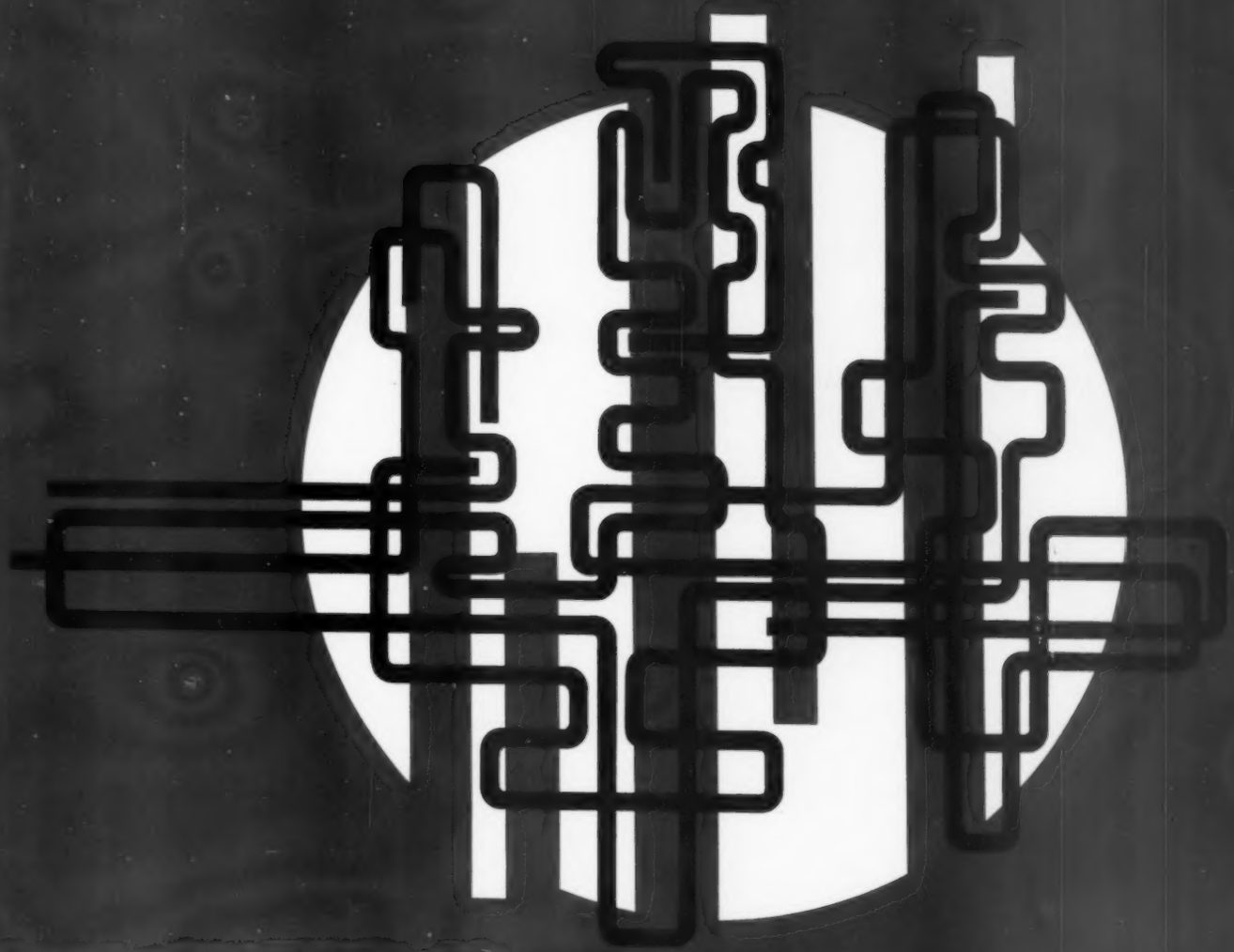
(Continued on page 76)

PIPING IN OIL REFINERIES

arranged in bundles comprising a medley of large and small diameters can be easily recognized as the essential link connecting the various pieces of equipment of the plant. Piping is employed for the transport of hot and cold, liquid and gaseous media; it must withstand high and low pressures alike; it is made from a wide variety of steel grades. Dimensions, selection of suitable types and the assembly of piping are based upon the American Code for Pressure Piping, the relevant API standards, as well as upon other standards established by the world's leading engineering companies; this is the reason why only experienced, renowned companies should be entrusted with the installation of pipe-work in oil refineries.

Well advised by Seiffert!

Our Supply Programme □ Complete piping systems suited to any given service conditions and media · Pipelines for power plants up to the highest pressures and temperatures, for long-distance heating systems, for the petrochemical industry and other industrial installations · Marine pipelines · Pipe specials according to German and American standard specifications · Valves and fittings · Storage tanks for petrol, oil and fuel, including pumping gear and filling equipment · Tanker ship discharging lines · Apparatus for thermal plants · Superheated steam coolers and containers · Ash removal installations and pneumatically controlled transportation equipment · Steel construction for pipeline installations



FRANZ SEIFFERT & CO

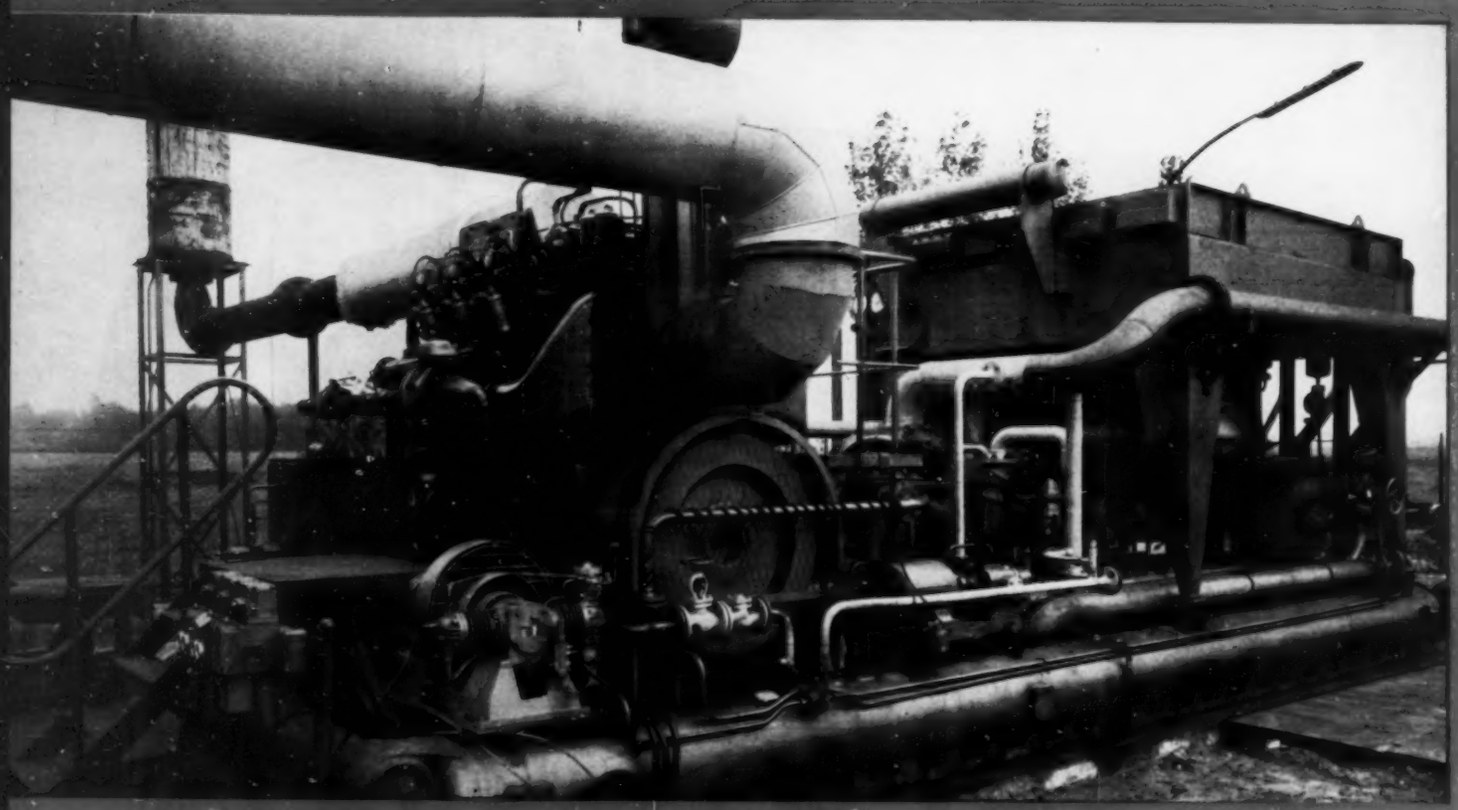
Aktiengesellschaft · 126, Hohenzollerndamm, Berlin-Grunewald · Germany
Phone: Berlin 89 02 21 · Western Sector of Berlin

SEIFFERT

T 398/1a

Specify Mannesmann compressors for oilfields and refineries

Wherever gas or diesel-engine driven compressors deliver continuous service ... in oilfields, long-distance gas transport, underground gas storage, and in petroleum refineries ... you can rely on Mannesmann-Meer for dependable, continuous, economic performance. Stationary units are available in ratings of from 300 to 3300 HP and skid-mounted models in ratings of from 300 to 600 HP. The compressor unit can be designed for specific requirements. For electric drive up to the highest pressures and rates of performance, we produce reciprocating opposed or vertical design compressors. Component parts made by Lohmann & Stolterfoht are also available: gear units and clutches, air-operated clutches, reducing gears, gear boxes, flexible couplings, shiftable clutches, special gear units and couplings.



Gas engine driven compressor in skid-mounted design

MANNESMANN-MEER AG

Mönchengladbach · Germany · Karmannstrasse 29 · Telex 0852 852

1393/1e

Specify Mannesmann precision piping and planned pipe systems

Illustrated below is a precisely planned pipe system carrying petrochemical products through a multibranch system of pipe lines in a refinery. The quality of these steel veins will determine the performance of the total installation.
High pressure, high temperature and chemical corrosion call for highest quality workmanship, materials and experience in pipe processing.
You can rely on Mannesmann-Rohrleitungsbau to deliver precision piping for the most intricate installations. We plan, deliver and erect refinery pipelines, pipelines for oil, gas and fuels, including pumping stations and storage tank installations, pipelines for all industrial uses, high pressure pipe lines and welded fittings.

Pipe system in a refinery

MANNESMANN-ROHRLEITUNGSBAU GMBH

Düsseldorf · Germany · Bleichstraße 6 – 10 · Telex 0858 2583

1993/1a

Fluids in motion

with Mannesmann

From precision production plants in Germany, Brazil and Canada, Mannesmann quality pipe and planned pipe systems are produced and delivered to serve the specialized needs of the worldwide petroleum industry. Drill pipe from Mannesmann taps oil wells. Crude oil and gases spurt from the earth through Mannesmann casing and tubing. Complex pipelines and systems by Mannesmann radiate from desert, offshore and jungle oilfields to refineries, storage and transportation depots, keeping vital fluids in motion through a dynamic network of steel veins.

At every operational phase from preliminary study to planning and execution, Mannesmann serves the oil-producing industry. Throughout the world for more than 75 years, Mannesmann has been recognized and its products specified by petroleum and petrochemical engineers for quality fabrication and engineering ingenuity.

We plan, deliver and erect refinery pipelines, pipelines for oil, gas and fuels, including pumping stations and storage tank installations.

To complete the picture, here is the manufacturing program of our worldwide plants:

In Germany

Seamless casing 4 1/2" to 20"

Seamless tubing 1.05" to 4 1/2"

Seamless drill pipe, with thread couplings or weld-on joint 2 3/8" to 6 5/8"

Seamless liners 3 1/2" to 6 5/8"

Seamless line pipe 1/8" to 20"

Longitudinal electric-welded line pipe up to 42"

Mannesmann-Spang extreme line casing 5" to 10 3/4"

Mannesmann-Spang extreme line tubing 2 3/8" to 3 1/2", manufactured under license from The National Supply Company, Pittsburgh, U.S.A.

Valves and Fittings in special designs

Seamless pipe made from non-alloyed, alloyed and highly alloyed austenitic steel suiting all specific requirements in oil processing

Containers, apparatus, and high-pressure vessels

Complete landing stages in tubular steel dolphin construction and offshore installations

In Canada

Seamless casing 4 1/2" to 10 3/4" OD with short or long threads

Seamless line pipe 4 1/2" to 10 3/4" OD

Seamless Standard pipe 20 ASTM 4 1/2" to 10 3/4"

Specialties, such as hot-finished seamless mechanical tubing and coupling stock, piling pipe, etc. Call our nearest sales office for details

In Brazil

Seamless line pipe from 3" to 10 3/4"

Seamless pipe and tubular products for oilfield and refinery use

In U.S.A.

Easton rigid unplasticized Polyvinyl Chloride (PVC) pipe, fittings and valves.

Magnetic inspection materials (various grades of iron powder).

All steel pipes, casings and tubings are supplied to API standard dimensions and material grades. For an authoritative roundup, get your free copy of MANNESMANN PIPE IN THE OIL-FIELD SERVICE.

MANNESMANN

MANUFACTURING PLANTS

In Germany Mannesmann Aktiengesellschaft, Dusseldorf. **In Canada** Mannesmann Tube Company, Ltd., Sault Ste. Marie, Ontario. **In Brazil** Companhia Siderúrgica Mannesmann, Belo Horizonte. **In USA** Easton Metal Powder Division, 900 Line Street, Easton, Pa.; Mannesmann-Easton Plastic Products Co., Inc., 900 Line Street, Easton, Pa.

SALES ORGANISATIONS

Mannesmann-Export GmbH, Dusseldorf. Representatives and branch offices all over the world. **In USA** American Mannex Corporation, Canada House, 680 Fifth Avenue, New York 19, N.Y. · Branch offices: Houston 2, Texas, 713 Texas National Bank Building · Los Angeles, California, 3450 Wilshire Boulevard, Room 703. **In Argentina** Mannex Argentina S. R. L., Avenida Córdoba Nr. 315, Buenos Aires. **In Canada** Canadian Mannex Corporation Ltd., 1304 - 4th Street S. W., Calgary, Alberta · Branch offices: Toronto, Ontario, 188 University Avenue · Vancouver, B. C. **In Brazil** Comércio e Indústria Mannex do Brasil S.A., Araujo Porto Alegre 36, 12° Andar, Rio de Janeiro · Branch offices: São Paulo, Praça da Republica, 270,7° Andar · Porto Alegre R.S., Praça Ruy Barbosa, 220,4° Andar.

1405/1e

prospects (Dogger beta-Sandstone) on the borders of these troughs.

On the eastern margin of the East Holstein in the subalpine basin during the last years led to increased drilling activity in 1960. Here one Dogger trough, well Ploen-Ost 26 was drilled about 16 kilometers north of the Ploen-Ost field from transgressive Hauterivian immediately into the Dogger beta main sandstone; however, this time there was an influx of water. The lower silty sand showed some good oil indications, but flowed salt water on test. With production in Ploen-Ost at 2,575 to 2,588 meters, this is the deepest producing oil field in Germany, after Suderbruch well 48 (2,341 meters and Vorhop-Nord (2,220 meters)). At the same margin location, *Boostedt-Ost 1*, 14 kilometers southwest of the *Ploen-Ost* oilfield drilled last year, found the objective sands structurally low and wet. The well was side-tracked updip in order to find the Dogger beta sand wedging out against the unconformity at the base of the Hauterivian. Surprisingly, well *Boostedt-Ost 1a* found the prospective sands about 11 meters deeper due to faulting.

On the northern flank of the Meckelfeld-Hohenhorn Jurassic trough, *Reitbrook-West 3* well was a successful test drilled for Dogger beta sands. A test yielded about 28 cubic meters of oil daily. 1.2 kilometers south an offset was completed as a flowing producer, testing daily 40 cubic meters (252 barrels daily) through a choke of three millimeters. Extension well *Reitbrook W 6*, about 1 kilometer south of the discovery well was completed in both pays with a daily rate of 12 cubic meters of the lower sandstone and 40 cubic meters from the upper horizon (4 mm choke). Further drilling will try to extend this field west to connect with the Meckelfeld-Sued field.

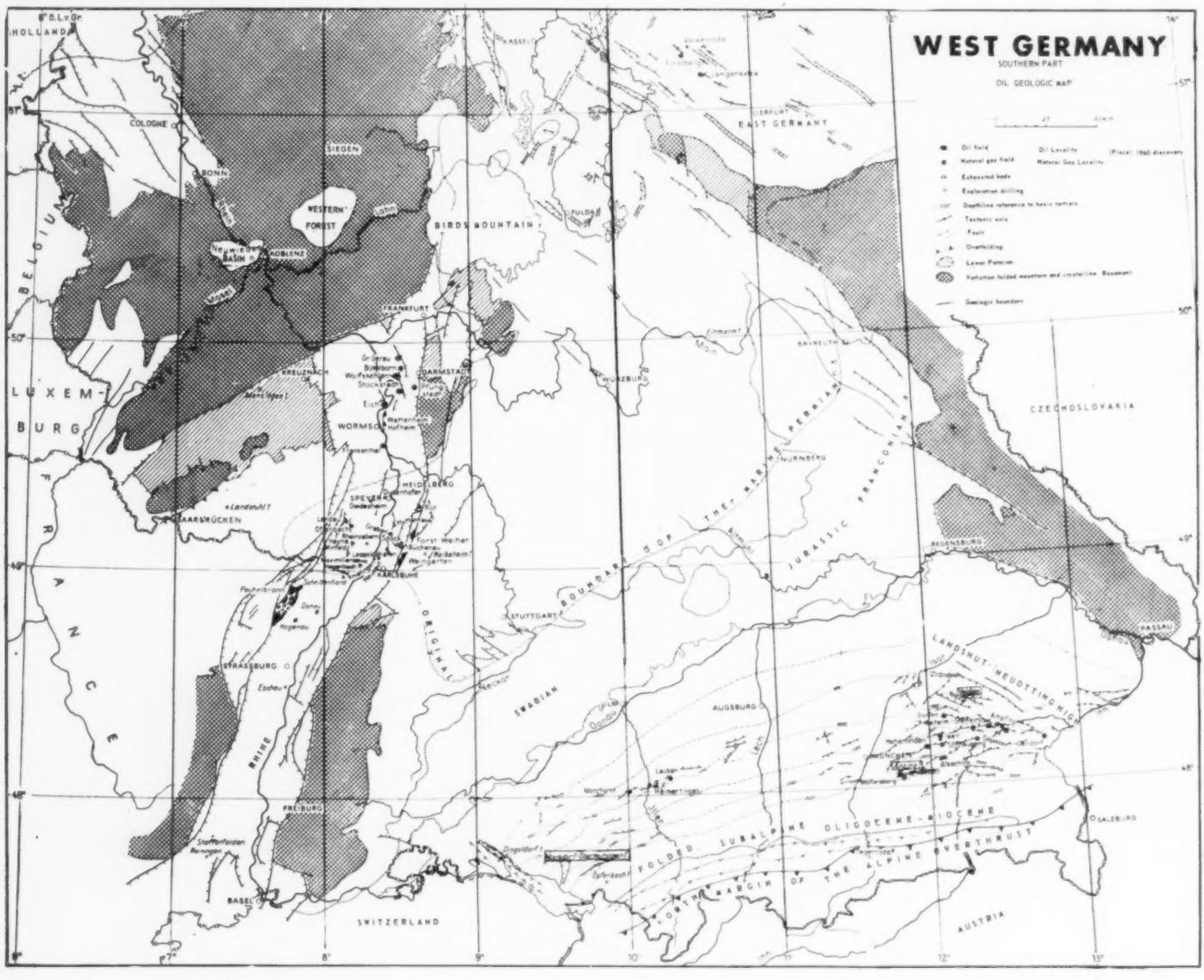
Well *Plon Schoenberg Z 1*, testing the upper part of the Hauptdolomit (the well could not be deepened because of exceptionally high pressure) is still waiting on special equipment. Previous tests yielded saltwater, gasoline, and a gas which consisted of 80% nitrogen and 20% methane and higher hydrocarbons.

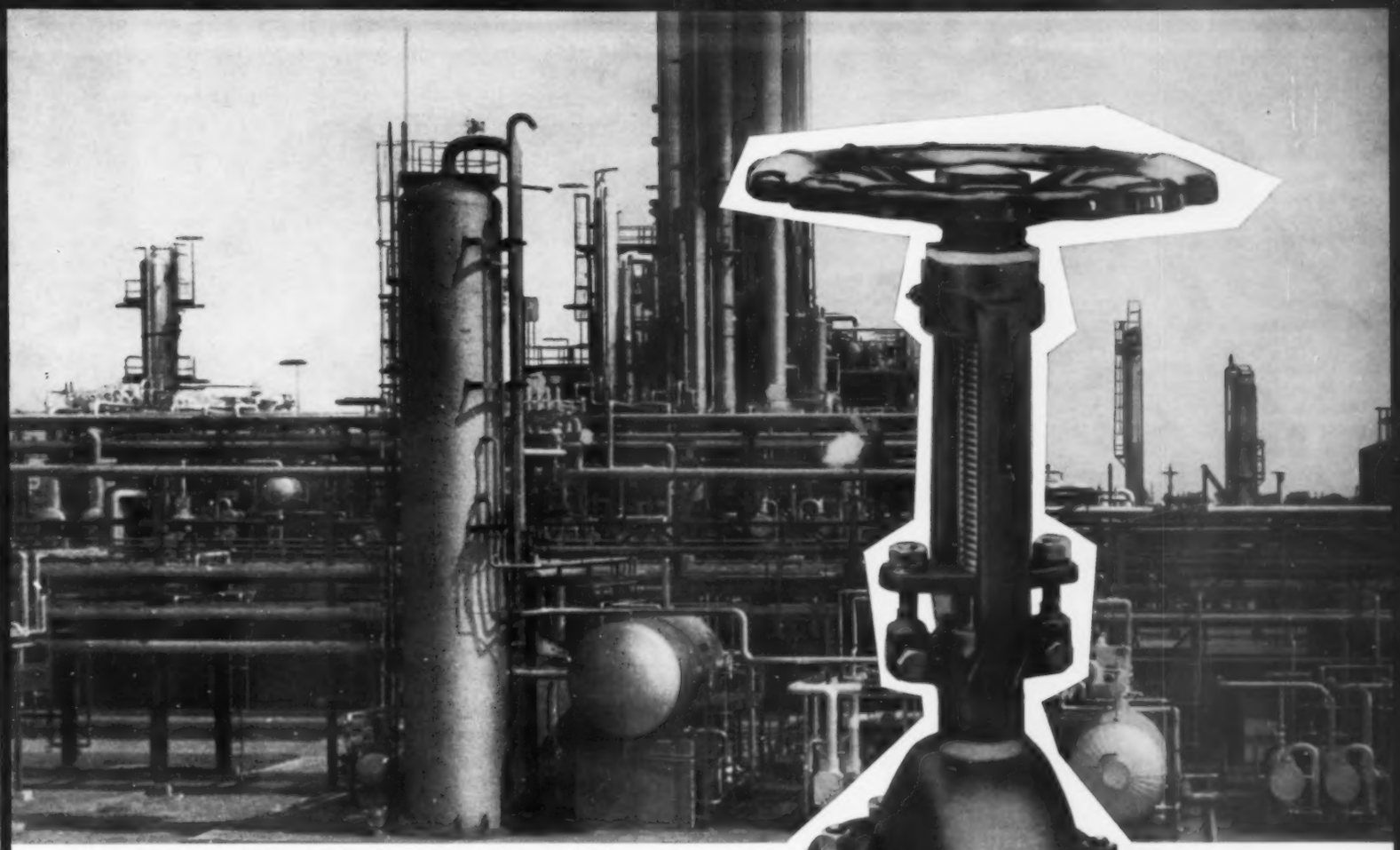
The previous oil discovery Poetrau which found three Dogger beta oil sands totaling 17 meters of thickness underneath the Middle Albian unconformity was successfully extended (300 meters to the west southwest) by Poetrau well No. 3. Further exploitation of this field was stopped due to the high content of sulfur (7%).

Area Between Elbe and Weser: Exploration activity in this region declined to 23 wells, compared with 34 wells drilled in 1959. Most of them had as their objective the Dogger, Lower Lias and Rhaetic sandstones. Drilling for Cretaceous porspects were more or less unimportant. Seven wells have been drilled for Zechstein carbonates. Two wells were producers (Gr. Hamburg 2, Volkensen 4 and Esperke 1).

In the area of the Pompeckj swell, where locally relics of Jurassic and Triassic basins are preserved underneath the Cretaceous unconformity, Volkensen 4 well found good shows of oil. The well was drilled downdip southeast of the Volkensen saltdome in search of the Garantiana sandstone wedging out against the Albian unconformity. Unexpectedly, the objective upper Dogger sands were missing due to truncation. Of great interest are impregnations of residual oil in thin beds of a silty sandstone. After deepening, the well encountered upper Lias in a Posidonia-shale facies of 175 meters thickness. A test on the Posidonia-shale yielded small amounts of heavy oil (0.926 specific gravity) with 4.8% of sulfur. During six months the well produced 159 tons. Though of minor significance, this result is of greater importance as Volkensen 4 for the first time proved hydrocarbons in this area. The number of oil produc-

(Continued on page 86)

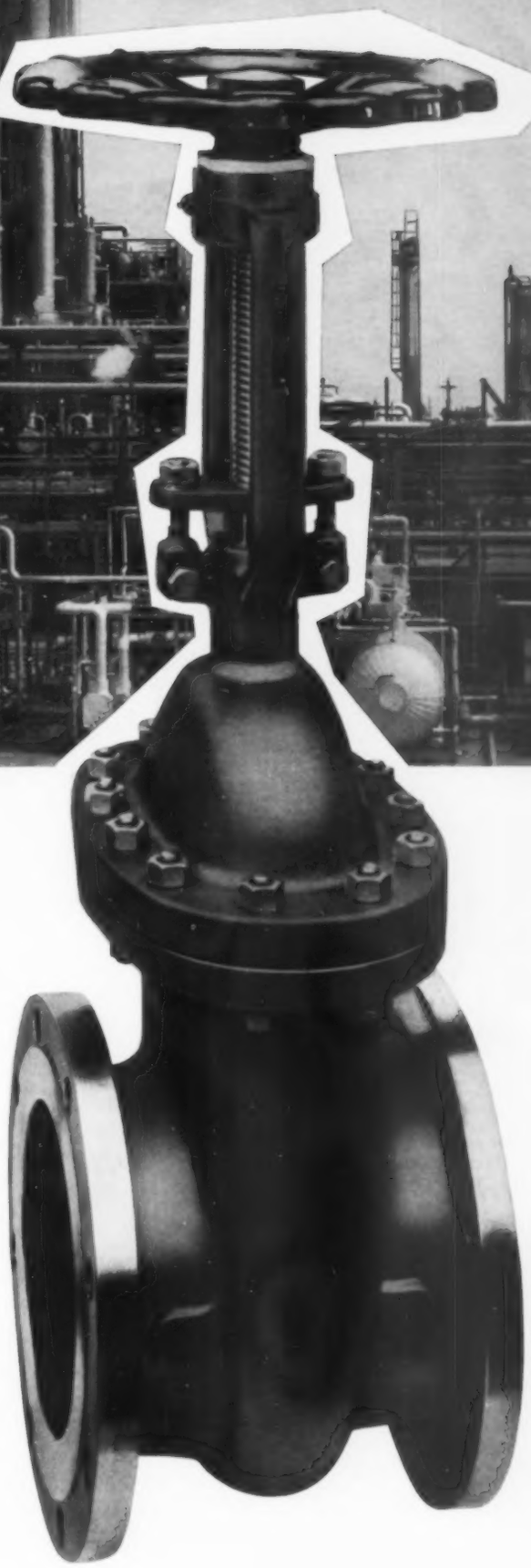




PERSTA-Valves

Forged Steel
PERSTA-Globe, Gate
and Check-Valves
are Dependable as a Result of:

Most Up-To-Date Design
Highest Workmanship
Quality Controlled Products

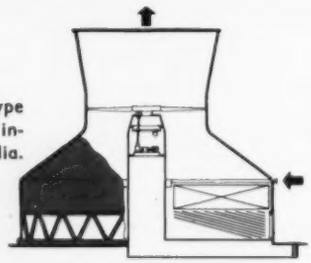


PERSTA

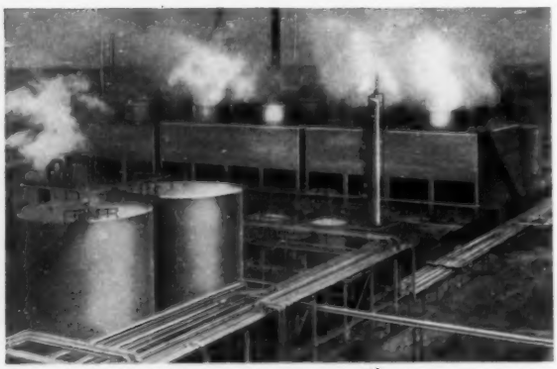
STAHL-ARMATUREN

SIEPMANN GMBH · KG · BELECKE / MÖHNE
GERMANY

PERSTA Reliable in Operation · PERSTA Reliable in Operation · PERSTA Reliable in Operation · PERSTA



Vertical section of a circular type cooling tower permitting the installation of fans up to 25 m dia.



Cell cooling plant at an oil refinery designed and erected by the Gottfried Bischoff KG and recently put into operation.

Today water is precious and valuable mainly in industry. In order to enable its use as cooling water a continuous circulation is necessary. Highest economy and lowest losses have to be guaranteed. Bischoff Water Cooling Plants solve all these problems.

Bischoff engineer, design and construct plants for water cooling, preparation of domestic water and waste water treatment. In order to utilize remaining products e. g. residual gas from refineries, LP-gas, light benzine or also natural gas Bischoff construct and erect plants for the production of synthesis or town's gas by means of thermal-catalytic cracking.

Our experienced engineers and specialists will advise and assist you to your fullest satisfaction with regard to any technical problems in these or similar fields.

Please inform us immediately, we are at your disposal.

GOTTFRIED BISCHOFF KG · ESSEN · RUHRALLEE 100 BISCHOFF **GERMANY**

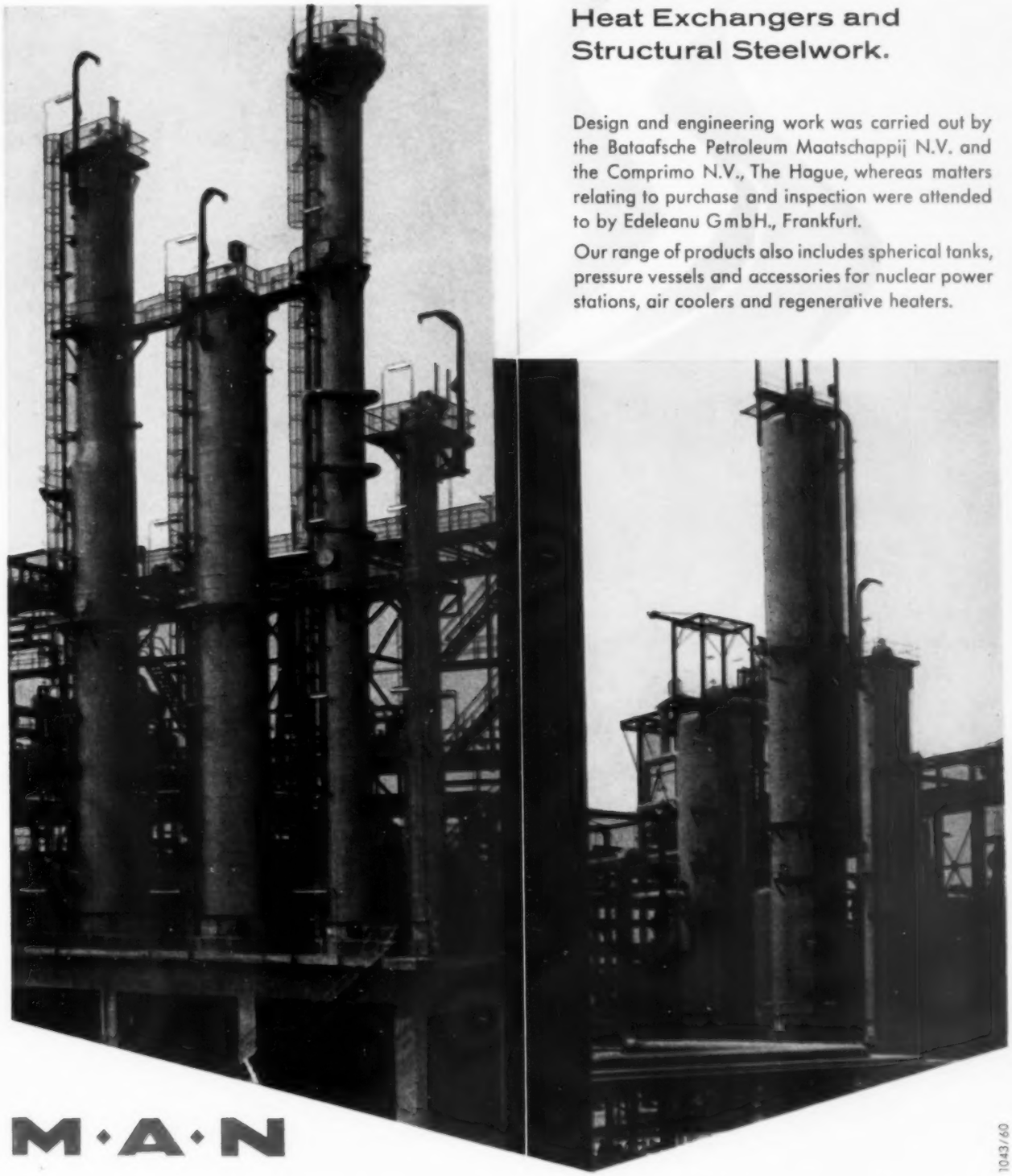
Phone 20591 · Telex 0857779

In 1959 we supplied to and erected on behalf of the Deutsche Shell AG. for their Godorf Refinery the

Distillation Unit
Gas Recovery Unit
Absorber Unit
Heat Exchangers and
Structural Steelwork.

Design and engineering work was carried out by the Bataafsche Petroleum Maatschappij N.V. and the Comprimo N.V., The Hague, whereas matters relating to purchase and inspection were attended to by Edeleanu GmbH., Frankfurt.

Our range of products also includes spherical tanks, pressure vessels and accessories for nuclear power stations, air coolers and regenerative heaters.

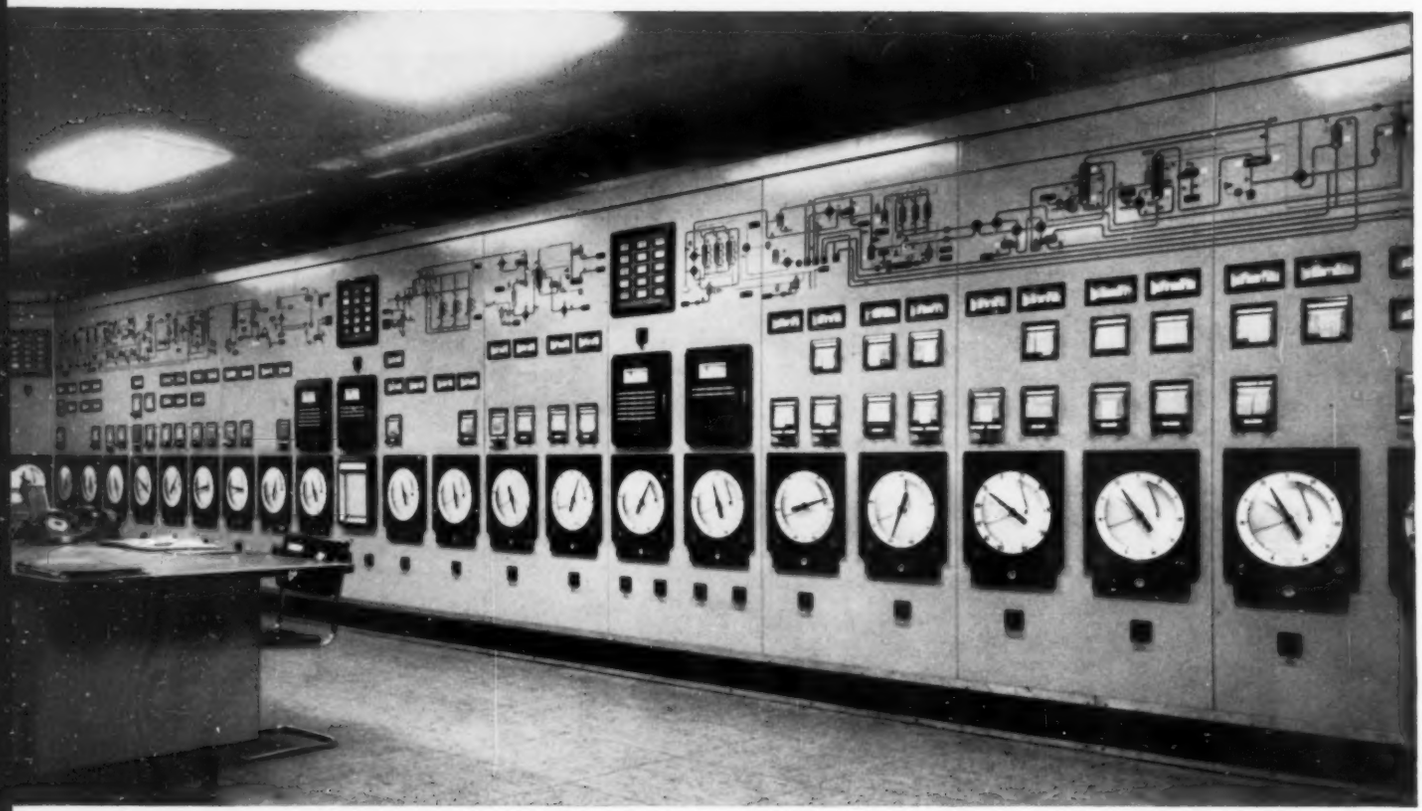


M·A·N

1043/60

MASCHINENFABRIK AUGSBURG - NÜRNBERG AG · GUSTAVSBURG WORKS

TRUSTWORTHY
EFFICIENT ●

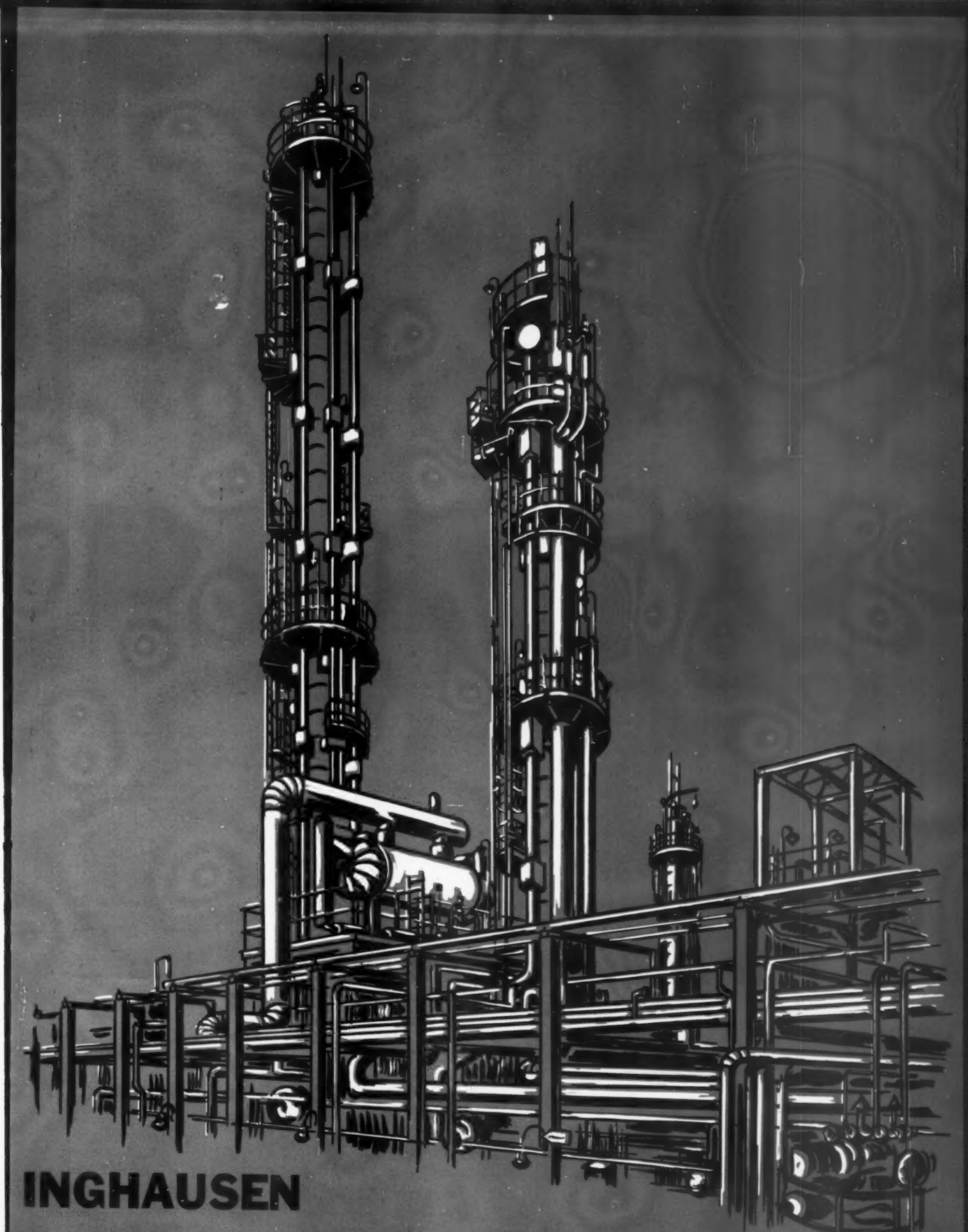


THE SKILL AND SENSE OF RESPONSIBILITY OF
OUR STAFF GUARANTEE RELIABLE WORK
IN THE PLANNING AND ERECTION OF
MODERN PETROCHEMICAL PLANTS,
SUCH AS PLANTS FOR THE PRODUCTION OF

**ETHYLENE, PROPYLENE, BUTYLENE, BUTADIENE,
STYRENE, PHTHALIC ACID AND
MALEIC ANHYDRIDE AMONG OTHERS.**

Still

FIRMA CARL STILL RECKL

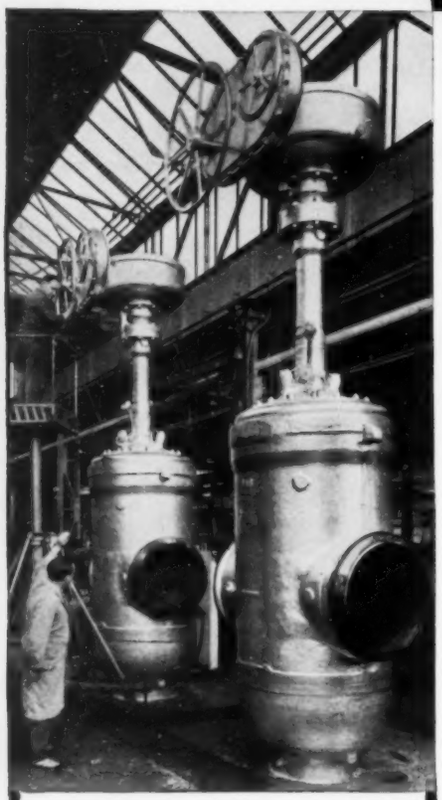


L INGHAUSEN

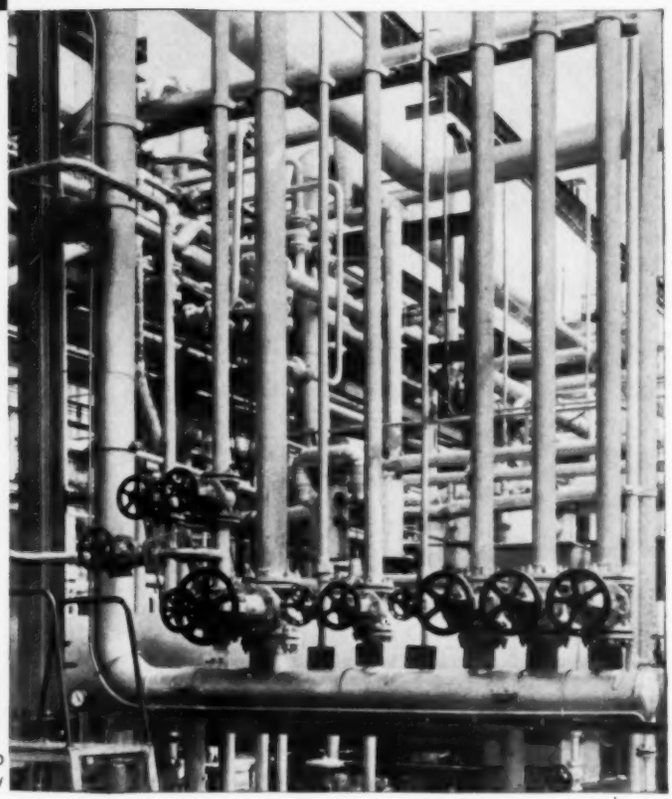
FOR THE OILFIELD

B&R

FOR THE REFINERY

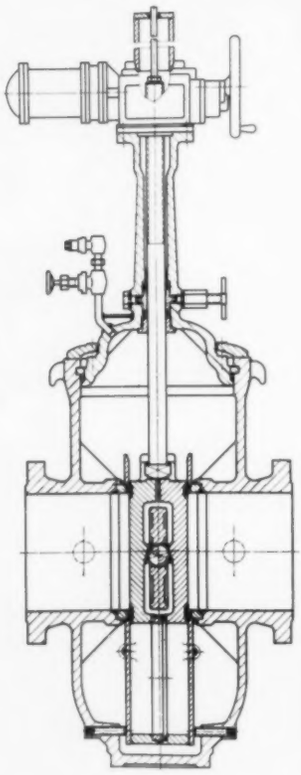


VALVES



GAS EXPANSION MANIFOLD
in a modern refinery

B&R PIPELINE VALVES 30"
Type OEP, Series 600 with spur and bevel gears



Oe 860e

The manufacturing program of B&R also includes two types of pipeline valves which are available in all sizes and pressure classes used by the oil industry.

Type OEP - a double disc gate valve with ball expansion.

Type OPL - a single disc gate valve without ball expansion, developed specially for long pipelines operating with uniform pressures. This valve is particularly suited for emergency shut downs.

These valves are manufactured strictly in accordance with API Standards 6 D and 600.

Both valve types have a pressure seal bonnet with an additional sealing unit which can be exchanged while the valve remains under pressure. The sealing unit of these valves - for which patents are pending - is a result of extensive research and field experience. B&R pipeline valves can be used for crude, refined products and gas.

More information on the type OEP in our bulletin Oel-KEA 700
type OPL in our bulletin Oel-KEA 703.

B&R have supplied oil valves to almost all major oil companies. This includes gate and globe valves, check and safety valves, catalyst plug valves and a variety of special valves. These valves have been in service for years under the most severe operating conditions without giving any difficulties.

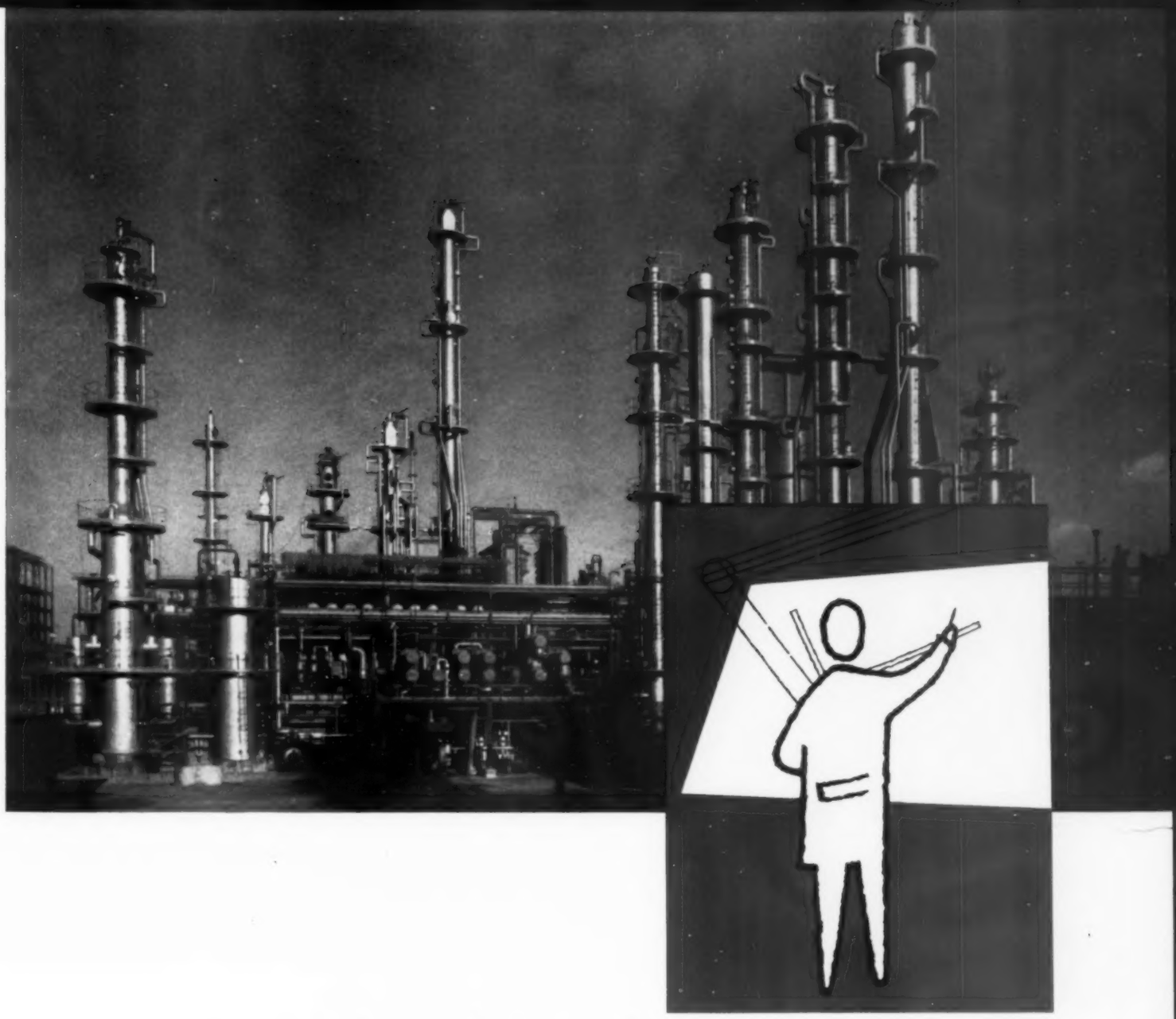
Please apply for our valve catalog Oel-KEA 701 e which covers gate, globe, check and safety valves.

Valves for very low temperatures are the latest line taken up by B&R. A large number of such valves has already been supplied to oil refineries, chemical industry and nuclear power plants. The largest were of the size 24", series 300, of steel to ASTM A 351, Grade LC 3, suitable for temperatures as low as −150° F. For still lower temperatures austenitic steel was used.

Additional information on low temperature valves is available upon request.

VALVES AND METERS WESTERN GERMANY

BOPP & REUTHER GMBH
MANNHEIM-WALDHOF



Research and Actual Operating Experience

the pillars of the success in our project work. Since our company is affiliated with the Farbwerke Hoechst group, our customers can be assured that their projects are based on the latest results of technical research and the experience gained in large size industrial plants.

Petrochemical plants designed and built by us meet all claims.

As an example we might refer to the high temperature pyrolysis (HTP) plant installed in the Farbwerke Hoechst works. This plant developed by scientists of the Farbwerke Hoechst is designed for the production of 45000 t/year of acetylene and ethylene.

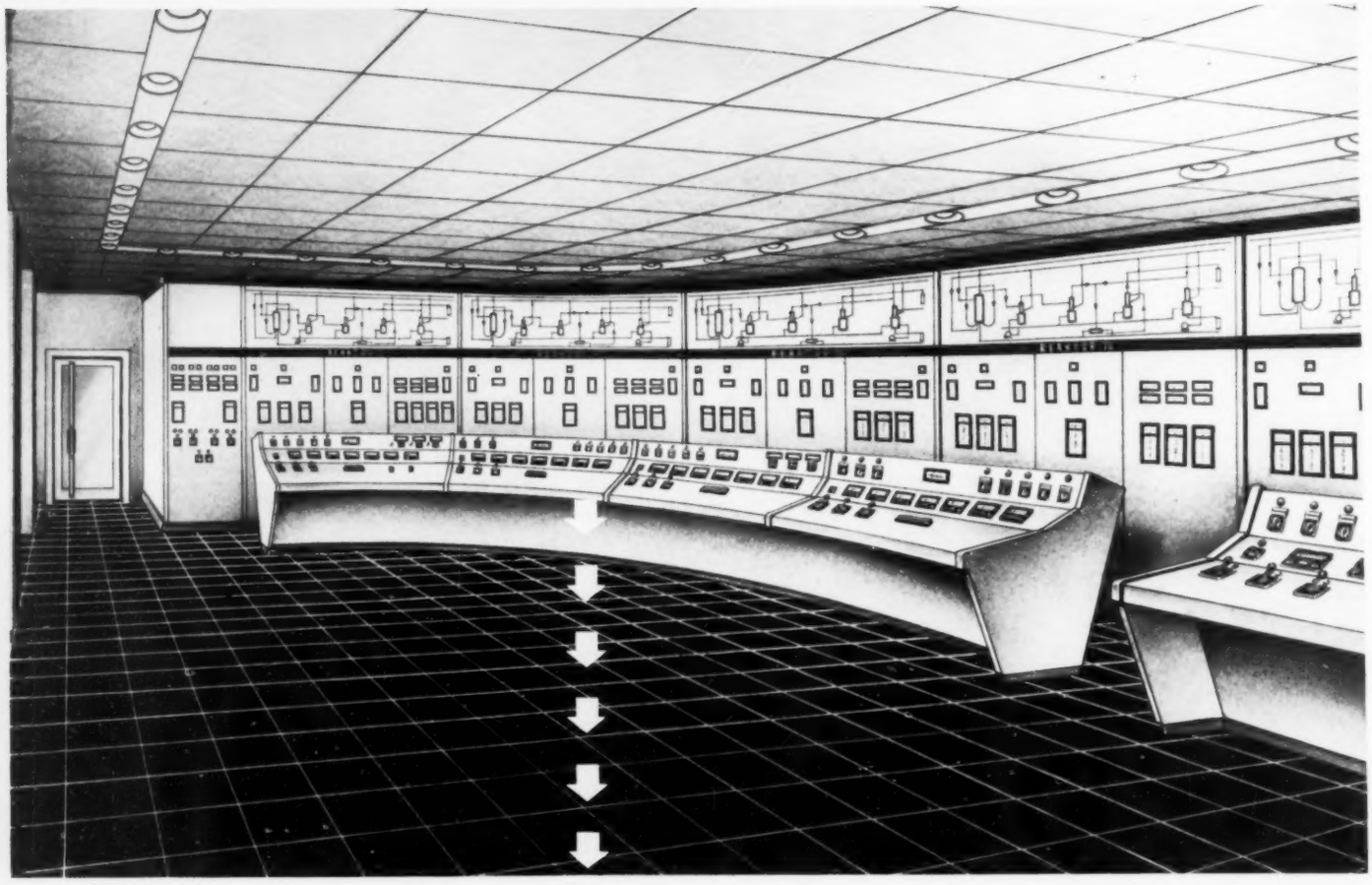
UHDE

FRIEDRICH UHDE GMBH DORTMUND

HOECHST

Our customers and interested parties abroad are requested to contact for advice and technical assistance their local representative of the

HOECHST-UHDE INTERNATIONAL GMBH FRANKFURT (M)-HOECHST



Central control room

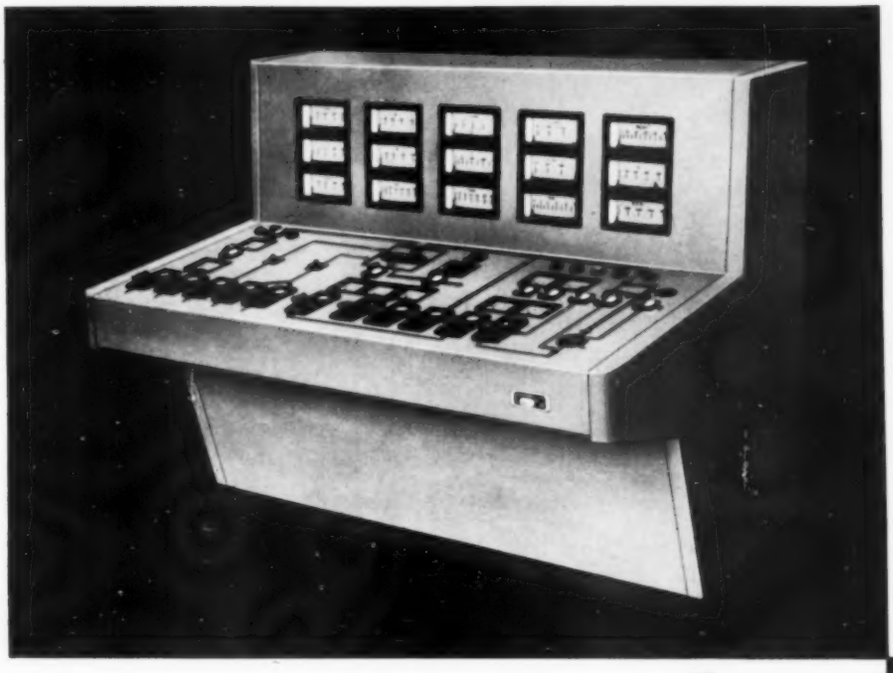
GESELLSCHAFT FÜR AUTOMATION M B H

APPLICATION ENGINEERING

to all German and foreign specifications

Planning and supplying

complete installations of instruments and control systems for industrial and chemical plants



Instruments and control systems for:

- oil refineries
- petroleum refineries
- petrochemical plants
- petrol recovery plants
- natural gas production
- polyethylene plants
- polypropylene plants
- polystyrene plants
- polyvinylchloride plants
- chlorine electrolytes
- steam power plants
- gas power plants etc.

WESTERN-GERMANY

Ty-L

Foreign representatives wanted

ESSEN · KRONPRINZENSTRASSE 13

ing wells out of the Posidonia shale (Suderbruch 48, Hohenhorn 18 and Meckelfeld-Nord 1) have now reached a total of 4 wells.

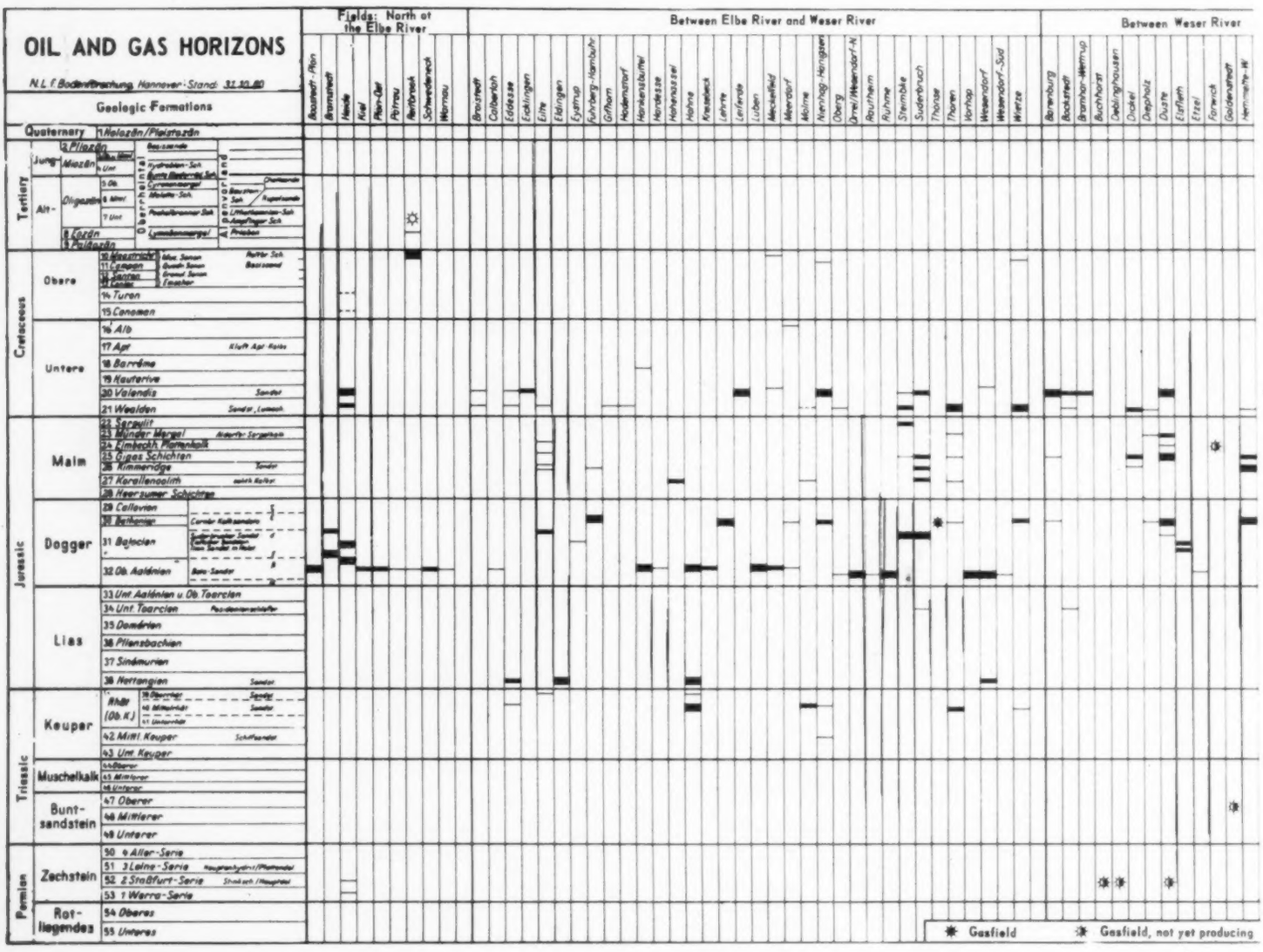
Well *Esperke 1* was located at the deep west flank of the Hope salt dome in order to investigate the Wealden 3 main sandstone. This sandstone had already been met with in a structurally deeper position by well Esperke V 1. Since in well Esperke 1 the Hauterive transgression had cut away the Wealden for the most part, only the lowest part of Wealden 3 with a thin and deeper sandstone was present. Wealden 3 shows a comparatively good oil impregnation. The well, now deepened to Dogger gamma has proved further oil indications in the Oolithic limestones of the upper Malm 1. Both horizons have been perforated and yielded 4.8 cubic meters (302 barrels daily) of oil through 3 mm-choke.

On the assumed outcrop of the Dogger beta sandstones, *Gr. Hamburg Well No. 1* was located in the western part of an east-west striking trough between the sale diapirs of Reitbrook and Sottorf respectively. Below the unconformity at the base of the Lower Albian unconformity at 2,200 meters were beds of Dogger beta underneath the prospective sandstones, underlain by a normal sequence down to Lias epsilon. At a depth of 2,454 meters the well had not perforated the bituminous shales (89 meters thick) of the Posidonia facies, which, after regional development amounts to 100 and 200 meters. *Gr. Hamburg Well No. 2,* 2.5 km. to the east encountered the oil-saturated Dogger beta main sandstone about 180 meters underneath the Albian unconformity (1,990 meters at a depth of 2,180 meters). Thus these wells have proved oilbearing Dogger beta in the above-mentioned trough. In a preliminary test the well flowed 24 cubic meters of oil in 3½ hours of 0.88 specific gravity oil. As is well known, there was an oilfield on the crest of the Sottorf saltdome, which produced 5,177 tons in 1937 to 1944, respectively.

Increasingly, drilling activity has been directed to objectives in the Zechstein. Seven Zechstein tests were abandoned or started, five dry, and two drilling or testing at the end of the year. Hoya Z 1, southeast of Bremen was drilled to 4,779.1 meters in the Upper Carboniferous (Westphalia C). Minor shows of gas were found in the Detfurth sandstone, but a test of this horizon resulted in small amounts of inflammable gas and saltwater. Production tests on gas showings observed in the Westphalian C with several coal seams between 4,595 to 4,704 meters were dry. A sandstone within the Westphalian D (4,479 to 4,523 meters) yielded 15 to 20 meters (95-97% methane) per hour. Due to a hydraulic treatment, only 100 cubic meters per hour of methane gas were measured.

In the eastern part of the Lower Saxonian Basin, northeast of Hanover, another Permian test, *Hämelerwald Z 1* was drilled, and was abandoned at 4,082.6 meters in a more or less uniform sequence of medium to coarse grained sandstones, which probably may be of Rotliegend age. The objective Hauptdolomit was in a transition facies of the Stinkschiefer.

North of the Harz Mountains two Permian tests have been drilled. Both wells—*Hahndorf Z 1* and *Goslar Z 1*—found the region of the Hauptdolomit in a facies of Stinkschiefer of stinking limestone. Minor showings of oil were found within this sequence. Beneath the transgressive Permian a sequence of graywacke and shaley clays of Lower Carboniferous (Kulm III *Γ*) was drilled. In the northwestern prolongation of the Fallstein anticline near the East Zone boundary a deep Zechstein seismic high was tested by Fallstein-Nord 1. As is well known several wells are producing oil out of the Hauptdolomit at the crest of the Fallstein anticline. Well Fallstein-Nord 1 hit the Hauptdolomit in the dolomitic facies. Preliminary drillstem tests on the partly oil impregnated dolomite yielded saltwater with small amounts



of oil. On frac treatment test, the well showed only salt water.

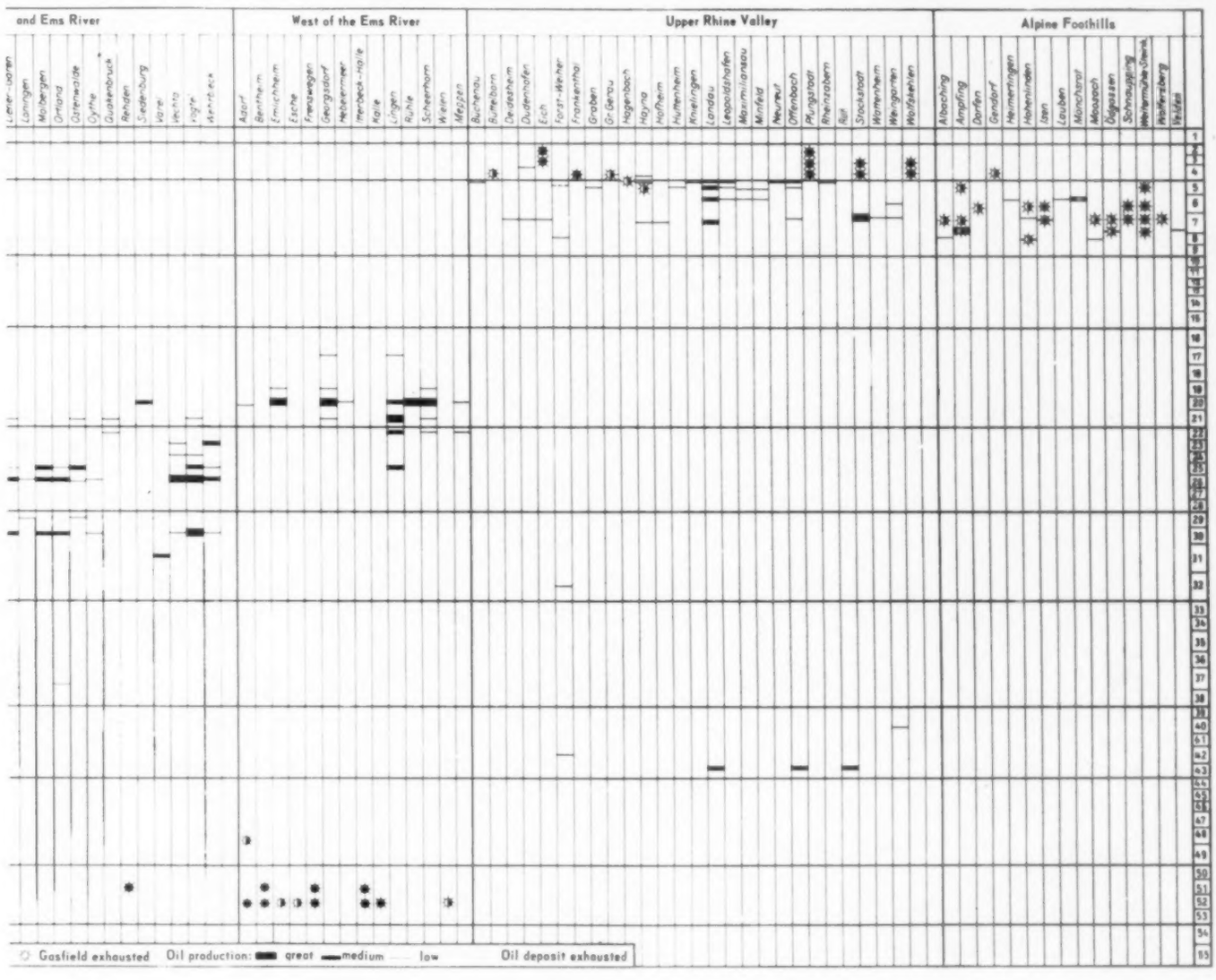
Near the southern margin of the Pompeckjswell, between the Hamwiede saltdome and the Bommelsen diapir, *Hamwiede Z 1* was drilled on a seismic high to test the Hauptdolomite. Surprisingly the Upper Cretaceous beds had a thickness of 2,572 meters. Below the Albian unconformity an undisturbed sequence from Middle Keuper to Upper Bunter was drilled. Evaporite beds were noted in the Muschelkalk and Röt. With regard to the thickness of Bunter and Zechstein of nearly 700 meters, the well was abandoned at 3,963.7 meters in the salt of the Röt. Few kilometers west of Volkensen Well No. 4 the Zechstein gas test Kallmoor Z 1 was started and at the beginning of November the well was drilling within the upper part of the Bunter.

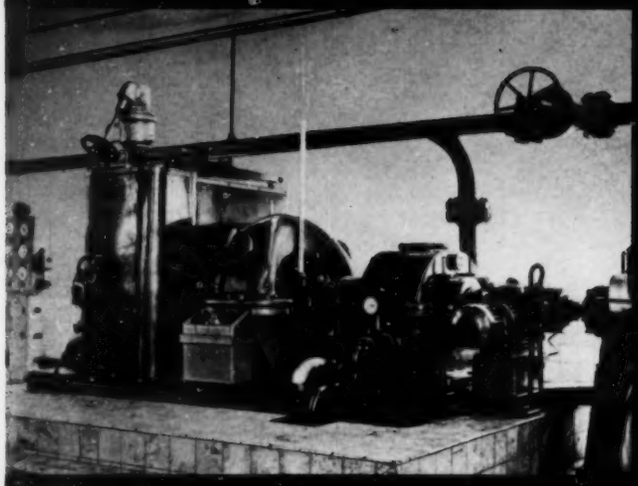
Area Between Weser and Ems Rivers: As in the previous year, intensive drilling activity in northwest Germany was noted in the area between the Weser and Ems rivers. Most of the oil and gas fields discovered since 1950 in this area are situated in local basins and uplifts along the northern margin of the Lower Saxony Basin. The constant subsidence of the central part of the Upper Jurassic—Lower Cretaceous basin resulted in an early migration of oil into traps along the northern margin of the basin. Oil producing horizons exist in the widespread sand beds of the Middle and Upper Dogger and Kimmeridgian or in coarse clastic pays in the Wealden and the Valendis. Gas possibilities occur in Zechstein carbonates, particularly main dolomite or in sandstones within the Bunter.

Out of 16 exploratory wells completed in 1960, two were productive. The greatest success was noted in exploration of Dogger epsilon and Upper Malm 2 pays, three km west of the Aldorf oilfield and in the Lower Cretaceous Bentheim sandstone in the western part of the basin. Additional exploration and extension Zechstein gas-tests were drilled in the central part of the basin, from which two extension wells to previous discoveries were producers.

In the western area of the Aldorf structure, *Aldorf SW Well No. 1,* an exploratory test, was completed in the Upper Malm 2 and Dogger epsilon, flowing 60 cubic meters of oil (378 barrels) in 16 hours through an eight millimeter choke from the Malm pay. The well was three kilometers west of the Aldorf field on a special high block south of a northwest-southeast striking fault. Within the Obermalm 2, an oil-saturated limy dolomitic sandstone of 6 millimeter thickness was encountered. In the Upper Dogger episilon, which was developed in a limy sandstone underneath the Upper Malm 1 unconformity, there was a flow of about 13 cubic meters of oil per day. This discovery can be regarded as an important extension of the Aldorf field. West of the Deblinghausen gas field, *Hohes Moor Well No. Z 1* was abandoned in the Zechstein limestone at a depth of 3,896 meters. The well found parts of the Hauptdolomit faulted out. Slight showings of gas have been tested from the upper part of the Buntsandstein only. At the northern margin of the Barenburg oilfield, well *Barenburg Z 1* has reached the Upper Bunter. A Zechstein well drilling at the end of 1960, *Ridderade Z 1,* was located at the northern margin of the *Lower Saxonian* basin (on 1 December at 3,188 meters in the Middle Bunter). Important new information on the Zechstein facies near the center of the basin was obtained in *Cloppenburg Z 1,* about seven kilometers southeast of the Molbergen oil field. The Hauptdolomit was developed in the stinkdolomite facies. Similar conditions were encountered by well *Oberlanger Tenge Z 1,* about 25 kilometers north of the Emsland Zechstein gas fields. In the western part of the basin west of the Quakenbruck oilfield a further *Zechstein* and *Buntsandstein* test, *Menslage Z 1* (12th December at 2,547 meters in the Rhaetic), was drilling at end 1960.

(*Continued on page 94*)





1,520-h. p. geared condensing turbine for a decoking pump

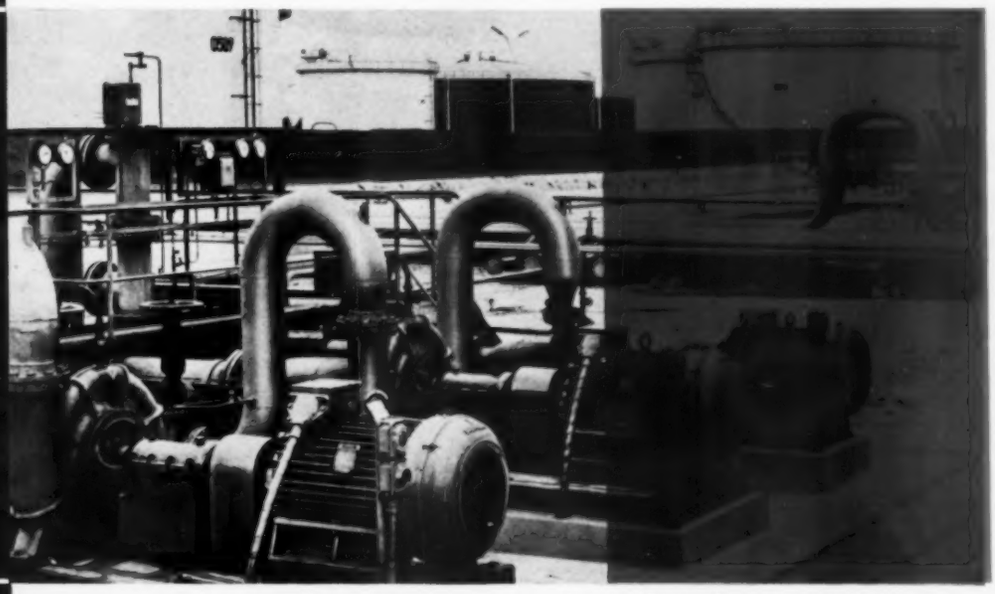
SIEMENS

No matter how difficult
your electrical problem,
we can solve it

The House of Siemens designs and manufactures all electrical equipment required for the winning, transport and processing of crude oil and natural gas.

The range includes: complete power stations, turbosets, turbines for drive applications, electric motors, transformers, transmission and distribution equipment, control gear, switchgear, supervisory equipment, cables and insulated wire.

You, too, should make use of our world-wide service and of our wealth of experience gained in more than a hundred years of activity in all branches of electrical engineering. We have agencies in 36 countries throughout the world.



Three phase flameproof motors in a crude oil refinery

25.89 E

SIEMENS-SCHUCKERTWERKE AKTIENGESELLSCHAFT
BERLIN · ERLANGEN

DYNAMIT NOBEL

SUCCESFUL
SEISMIC EXPLORATION
WHETHER REFLECTION
OR REFRACTION
WITH:

SEISMO GELIT
SEISMONIT
AMMONIT 'S'
IN VARIOUS CARTRIDGES
WITHOUT AND WITH
SCREWING DEVICE 'RAPID'

SEISMIC ELECTRIC
DETONATORS
REACTION TIME: BELOW
1 MILLISECOND STATIC RESISTANT

Detonating Fuse:
DYNACORD and
HEXACORD
PERFORATORS

Alfred Nobel

DYNAMIT NOBEL AKTIENGESELLSCHAFT Troisdorf

West-Germany

For the Petroleum Industry and Allied Fields BASF offers

2102

Processes Hydrocracking, hydrofining and catalytic dehydrogenation — desulphurization of naphthas and Diesel oils, refining of crude benzole by the BASF Scholven process
Alkazid Process — removal of H_2S and CO_2 from refinery and liquid gases, etc.
BASF Claus process — recovery of sulphur from H_2S
Catalysts and **packings**
Chemicals, solvents and **desiccants** of various types
Auxiliaries for oil production and refining, additives for the improvement of motor fuels and lubricants
Dyestuffs for motor fuels and lubricants
Cast or **outer-tone modifiers** for lubricating oils
Test engines for octane and cetane number determination
Test apparatus for HD oils

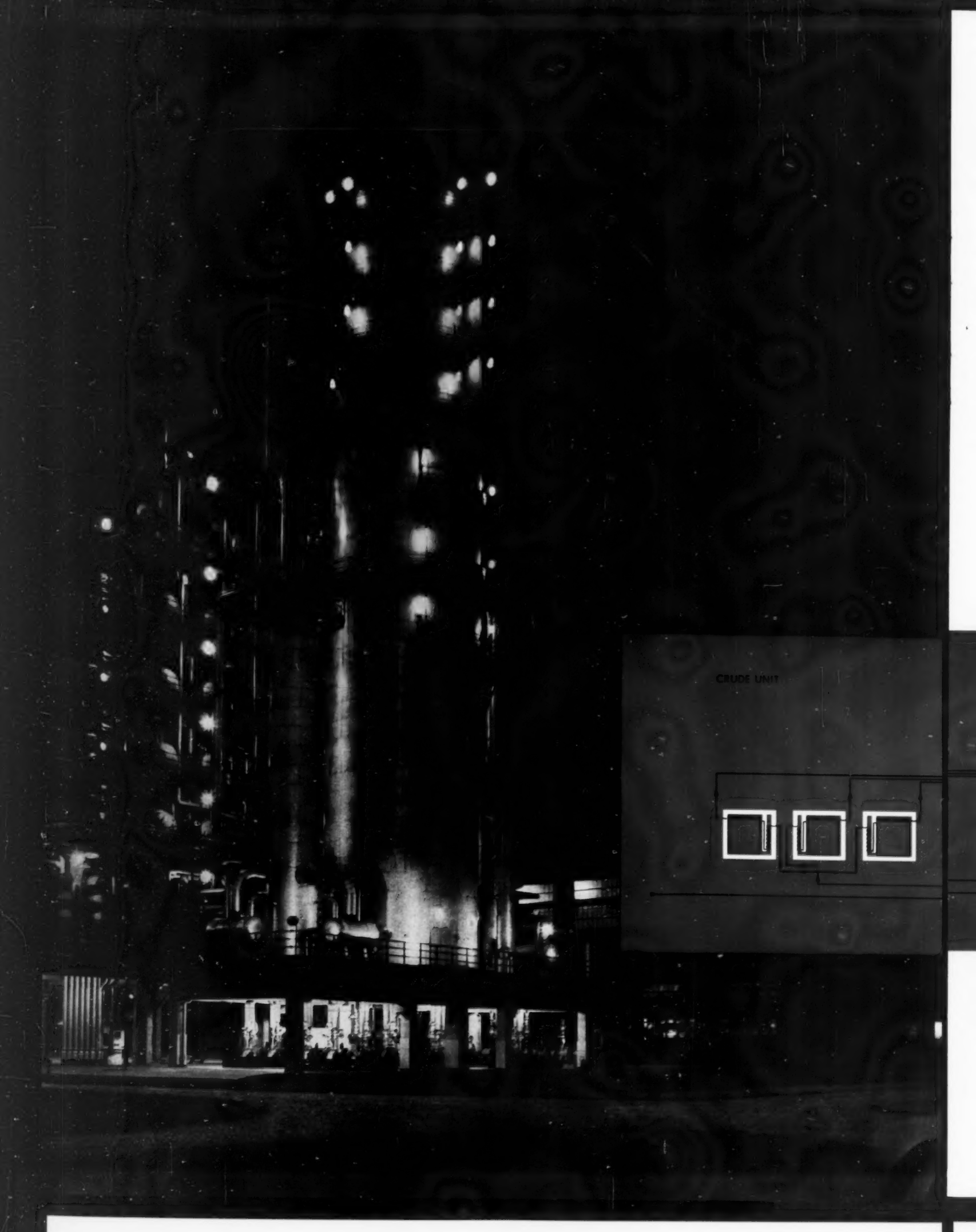
Our agents in more than 80 countries are at your service and will gladly supply literature describing our products.

Enquiries in U.S.A. should be addressed to **BASF Incorporated,** *375, Park Avenue, New York 22, N. Y., Tel. Plaza 1-0240*

BASF knows how

Badische Anilin & Soda Fabrik AG

LUDWIGSHAFEN AM RHEIN


CRUDE UNIT

Success is Yours-

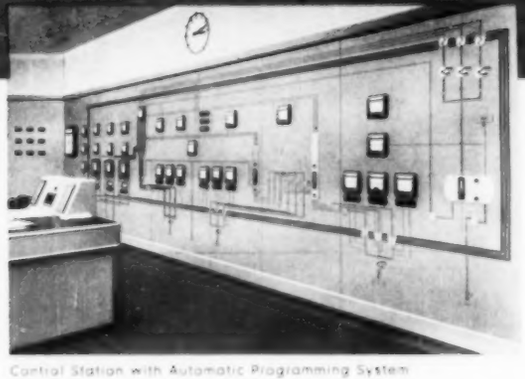
if you connect yourself with experience,
if you make contact with KOPPERS

It was Heinrich Koppers with his basic coke oven design who influenced decisively the development of the coking industry after the turn of the century. Koppers became a pacemaker in the field of refining any kind of fuel by carbonization and gasification. For more than 25 years Koppers has ranked among the leading firms in distillation technology.

Wherever your problems, your questions of design and economy and whatever your future developments — Koppers will manage them. The modern requirements of automation are met by Koppers' own specialists — by a happy combination of process and control conditions in each stage of your planning.

KOPPERS designs and erects for the mineral oil industry:

Complete refineries ■ Single units for distillation under vacuum, normal pressure and elevated pressure ■ Plants for gasoline stabilization ■ Hydrofiners for desulfurization ■ Reformers for aromatization ■ Plants for chemical treatment ■ Plants for preparation of natural gas by removal of gasoline, recovery of L.P.G., drying and desulfurization ■ Plants for further processing mineral oil products to synthesis gas by the Koppers-Totzek process, to town gas and ethylene as feedstock for the petro-chemical industry ■ Plants for natural and refinery gas reforming to town gas by thermal or catalytic processes ■



Control Station with Automatic Programming System

Plan and build with

KOPPERS GERMANY

HK MR

Heinrich Koppers G. m. b. H., Essen, Germany, Moltkestrasse 29, Telex 0857 817 • Gesellschaft für Mess- und Regeltechnik m. b. H. · Essen

WESTERN GERMANY—GEWERKSCHAFT BRIGITTA PRODUCTION INFORMATION
(First Half 1960)

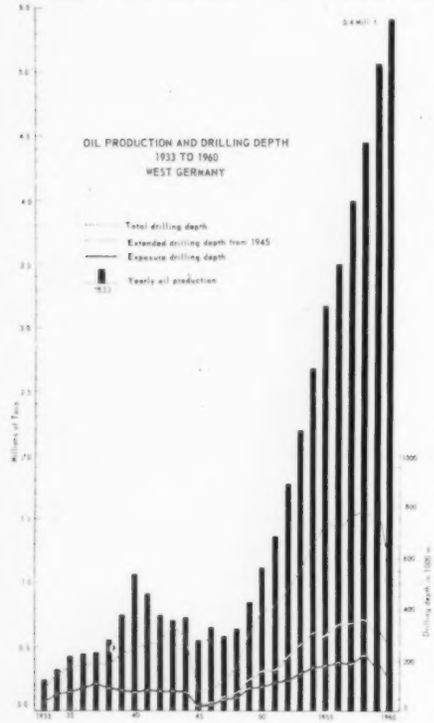
Name of field	Steimbke-Area	Fuhrberg-Ost	Hambuhren	Suderbruch	Eilte-West	Diepholz	Varel	Esperke
Year of discovery	1936/1940	1940	1941	1940	1956	1957	1957	1960
Footage drilled during 1960—I	—	—	—	—	3,012	—	20,648	4,559
Number of wells completed during 1960—I	3	—	—	—	—	—	3	1
a) oil wells	3	—	—	—	—	—	3	—
b) gas wells	—	—	—	—	—	—	—	—
c) dry wells	—	—	—	—	—	—	—	1
Number of wells actually drilling as at 30.6.1960	—	—	—	—	1	—	1	—
Number of drilling wells suspended as as at 30.6.1960	—	—	—	—	—	—	—	—
Number of flowing wells as at 30.6.1960	4	—	—	—	—	1	—	—
Number of pumping wells as at 30.6.1960	197	29	15	79	16	3	10	1
Number of other artificial lift wells as at 30.6.1960	—	—	—	—	—	—	—	—
Number of oil wells shut in as at 30.6.1960	58	10	5	7	1	4	4	—
Producing depths as at 30.6.1960, feet	740-2,130	910-1,510	460-1,840	3,790-5,100 6,670-7,680	5,150-6,230	1,940-2,620 2,720	5,072	4,240-4,410
Total crude oil producton during 1960—I in barrels	192,714	18,199	3,596	444,054	169,714	19,290	152,772	3,761
Average crude oil production during June 1960 bbl/d	1,208	96	20	2,379	871	124	966	14
Accumulative crude oil production up to 30.6.1960	7,820,772	1,530,589	366,274	10,349,218	947,506	94,666	304,407	3,761
Bases of crude	Asphalt	Paraffin	Paraffin	Paraffin	Paraffin	Paraffin	Paraffin	Paraffin
API gravity of crude	25.5	23.9	23.0	1) 32.5-35.8 light 2) 25.7 heavy	32.8	33.5	25.5	35.3
Name of producing formation	Valanginian/ Wealden/Malm/ Dogger (Cornbrash)	Dogger (Cornbrash)	Dogger (Cornbrash)	*)	Malm/ Dogger (Cornbrash)	Weaden/ Malm/ Dogger	Dogger (Elsflether Sandstein)	Wealden/Malm
Age of producing formation	L. Cretaceous Jurassic	Jurassic	Jurassic		Jurassic	L. Cretaceous Jurassic	Jurassic	L. Cretaceous Jurassic
Type of formation	Sandstone/ Oolitic Lst Calcareous Sst	Calcareous Sst + shell breccia	Calcareous Sst + shell breccia		Sandstone/ dolomitic sandstone	Sandstone sand	Sandstone	Sandstone/ Calcareous sandstone

*) 1) Dogger (Cornbrash), Malm and Liassic epsilon; Jurassic; Oolitic limestone/sandstone, Calcareous sandstone/bituminous marly slate
2) Valanginian: Lower Cretaceous, marly sandstone. Source: Shell Group Semi-Annual Report.

Sidewall cores in the Zechstein gas well Buchhorst Z 1 showed oil saturation of the Valendis sandstone. 540 meters west of Buchhorst Z 3 extension well *Wehrbleck-Ost 1* hit the gas cap of the oil bearing Valendis pay. Structurally deeper wells (Wehrbleck-Ost 2, 3, 4 and 5) found oil at depths of 822 to 844 meters.

A separate uplift on the southeastern prolongation of the Loeningen structure was investigated by well *Loeningen SE 1*. The well, 4.6 kilometers southeast of well Loeningen No. 2, encountered several good oil indications within the Middle Kimmeridgian and Upper Dogger (Cornbrash).

Area West of Ems River: Within the western part of the Lower Saxonian Basin the exploratory activity was directed chiefly to testing the Zechstein two pays: (Platten and Hauptdolomit) for gas and further investigation of Lower Cretaceous (Bentheim sandstone) in the vicinity of oil- or gas-bearing fields. Of seven exploratory wells in this area, four were Zechstein gas tests. They resulted in the discovery of one new gasfield (Ratzel) and the oilfield Meppen.



Within the general ascent of the Zechstein in a south direction, an uplift delimited by faults has been recognized by seismic methods seven kilometers east of gasfield Wielen and 10 kilometers northwest of the gasfield Itterbeck-Halle. On the crest of this uplift well *Ratzel Z 1* had been located for investigation of the possible gas contents of the Platten-Dolomite and main Dolomite. By falling out of the Aller-Cycle the well came from the Lower Buntsandstein immediately into the Leine Salt. The Platten-Dolomite which all in all had a thickness of 43 meters, was submitted to a test and proved gas (600 to 800 cubic meters of gas per hour through a 10 millimeter choke; casing-head pressure 15 to 28 atu). The main Dolomite which presumably was reduced in thickness because of a fault, yielded 2,000 cubic meters per hour through four millimeter choke at a casing head pressure of 170 atu when a casing test was carried through. The gas producing well showed some remarkable traces of oil on joint planes of the Platten-Dolomite.

West of Meppen and southeast of Fehndorf peninsula the Bentheim-sandstone lacking clay intercalations was drilled in proved seismic highs by well *Meppen 1* in 66 meter thickness. The upper six meters of medium-grained sands are free from water while the lower following oilsand showed indications of inundation. Below the Valendis was the Wealden in thicker marginal facies. The Serpulit was oil impregnated in its porous limstone layers. A test on the porous deposits of the Gigaslayers had salt water flow with minor quantities of oil as a result. After frac treatment, a daily oil influx of 10 to 12 cubic meters was attained by a pumping test out of the Serpulit. The extension well *Meppen 2* which had been located a good 350 meters further on to the southwest with the purpose of meeting the Bentheim-sandstone structurally higher, quite unexpectedly has encountered the oil reservoir deeper and therefore completely inundated. When, therefore, the hole was deepened so as to prove up the oil-bearing horizon in the Upper Wealden and Serpulit, the well drilled the Wealden in reduced thickness. Consequently the Serpulit, showing only poor permeability, lay higher than in Meppen 1 well. After perforating the coarse crystalline, cavernous and jointed limestone in the Middle Munder Marl, containing also Ooid layers the well had an initial oil production of six cubic meters through a millimeter choke.

After production well *Meppen 3*, which also came in in the Malm, the extension well, Meppen 4 located one kilometer south of the discovery well now has also penetrated the Bentheim sandstone with a thickness of 49 meters, 43 meters of which are oil-impregnated. The first production test yielded one cubic meter per hour through a three millimeter choke. Further wells may prove the extension of the new Valendis deposit which lies in the eastern prolongation of the Hebelermeer structure. At the end of September there were four wells on production producing a total of 1,369 tons.

A Zechstein seismic high southwest of the Esche gas-field was tested by well *Neuenhaus Z 1*, which was drilling at the end of the year. At the end of November the well was drilling within the Hauptanhydrit at a depth of 2,540 meters.

At the northern margin of the Lower Saxonian Basin a new gas bearing horizon was discovered in 1959 within the Buntsandstein by the *Goldenstedt T 1* well. In this well a main dolomite test failed due to technical reasons. Various shows of gas were found in a sandstone of the Detfurth Group (Middle Buntsandstein). On test the well flowed 65,000 cubic meters per day through a four millimeter choke. In the Emsland area there was a second Triassic gas discovery in the northern part of the Adorf gas field by extension well *Adorf Z 7*. This well was completed in the Bausandstein zone of the Buntsandstein, flowing 60,000 cubic meters of

(Continued on page 102)

WILLY THIELE

CELLE, BREMER WEG 27
GERMANY

Telephone: 5453, 3953

WE ARE CONTRACTORS for Oil Drilling, Geophysics, Mine Operations

OUR FIELD OF WORK

Drilling, Mining, and Foundations

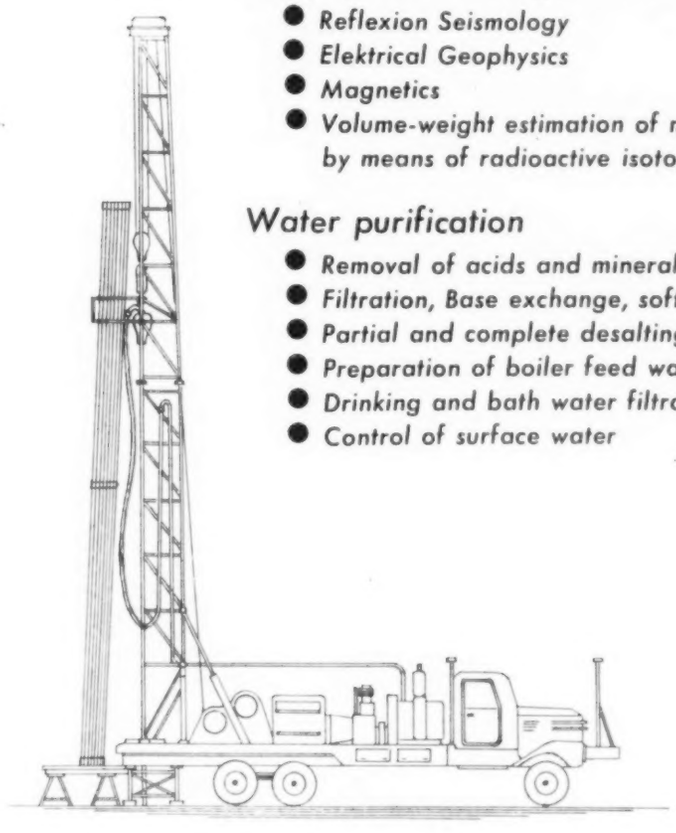
- *Deep and shallow drilling for oil, coal, ores, and all minerals*
- *Well drilling and water supply*
- *Mining works*

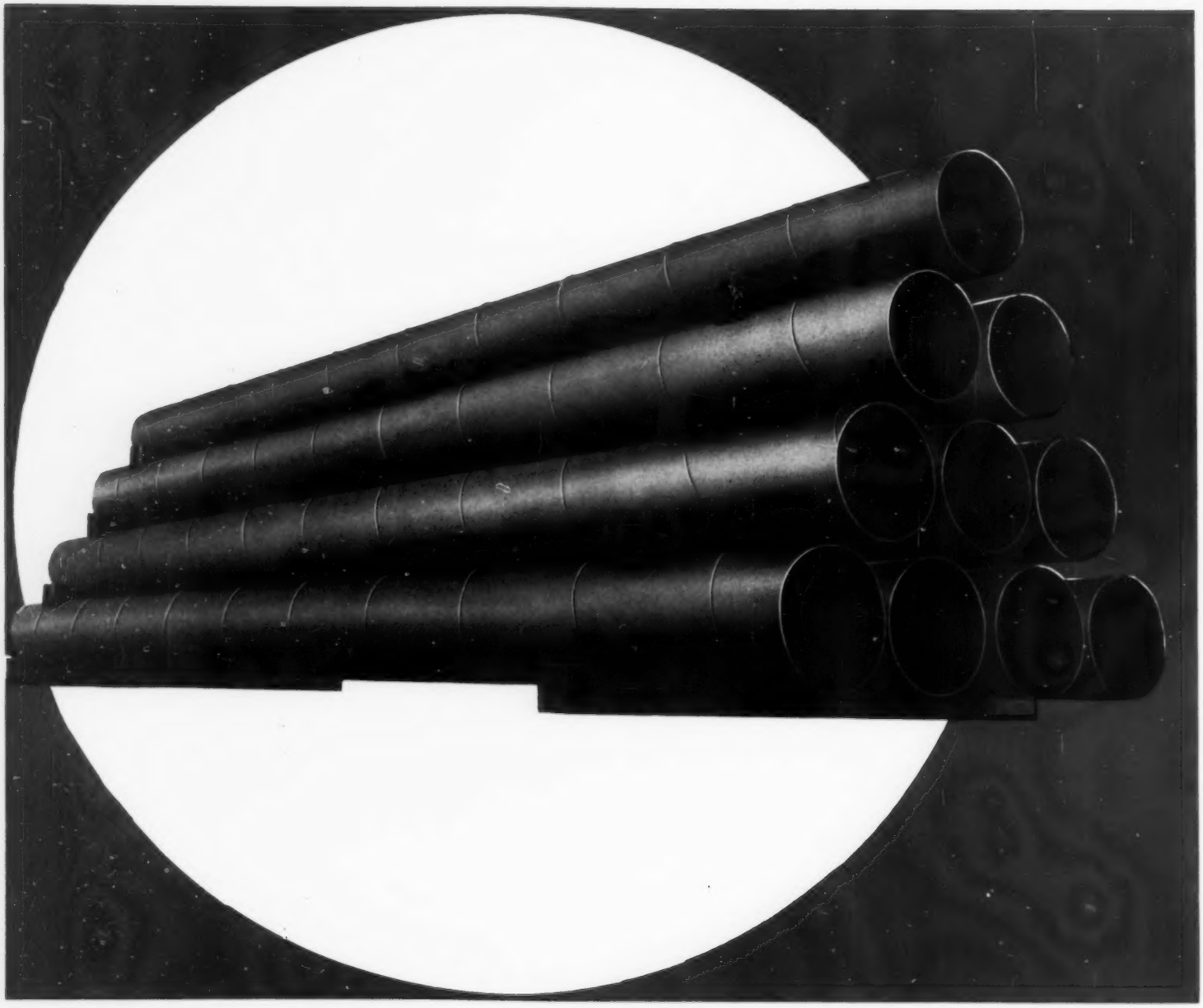
Geophysical investigation of productive strata

- *Reflexion Seismology*
- *Elektrical Geophysics*
- *Magnetics*
- *Volume-weight estimation of mining prospects and ore bodies by means of radioactive isotopes*

Water purification

- *Removal of acids and minerals such as iron and manganese*
- *Filtration, Base exchange, softening*
- *Partial and complete desalting contact and decarbonizing*
- *Preparation of boiler feed water, degasing*
- *Drinking and bath water filtration*
- *Control of surface water*

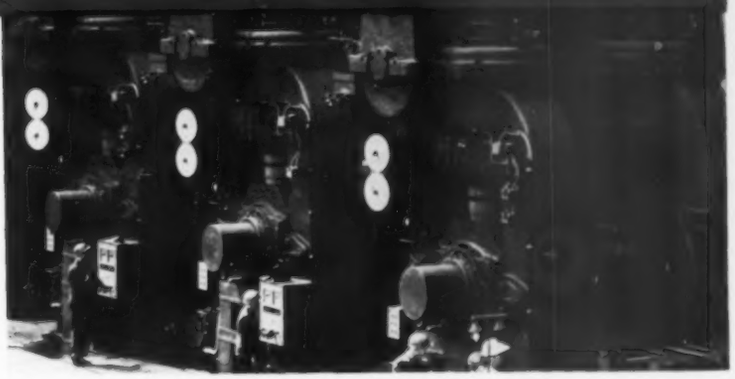




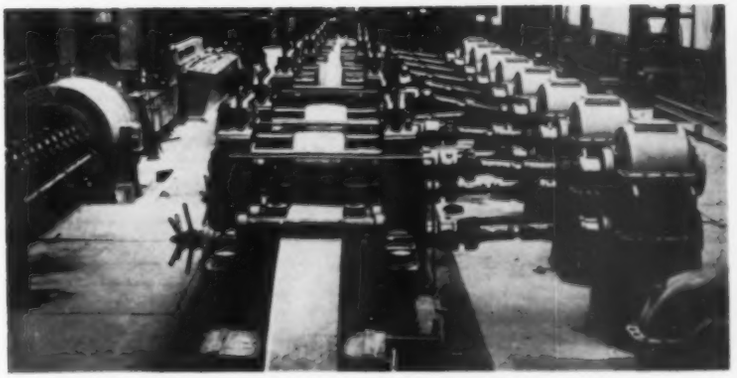
HOESCH EXPORT GMBH • WESTERN GERMANY • DORTMUND • SUDWALL 21-23

AMERICAN HOESCH INC. 375 PARK AVENUE, NEW YORK 22, N. Y.

HOESCH



Quality requires permanent improvement of the equipment. Hoesch has always tried to meet this requirement through their investment program. The Hoesch steel works deliver quality steels of every kind. The Hoesch rolling trains offer a wide rolling program. Here the steel strip is manufactured, too, which corresponds to the API specifications as far as quality and tolerance are concerned.



At the recently established plant of the Hoesch Rohrwerke A.G. at Hagen the steel strip is formed to electric resistance welded pipes up to a dimension of 8⅝". These pipes are supplied with the API monogram and meet the specifications for line pipes API 5 L and API 5 LX.

The Dortmund-Barop Plant of the Hoesch Rohrwerke A.G. produces, from sheared wide strip, both inside and outside welded Hoesch spiral pipes in accordance with the Ellira Welding Process, up to a diameter of 60"; these pipes are used for gas-, oil- and water lines of large diameters as well as piling pipes.

HOESCH AG DORTMUND

K 1069 E

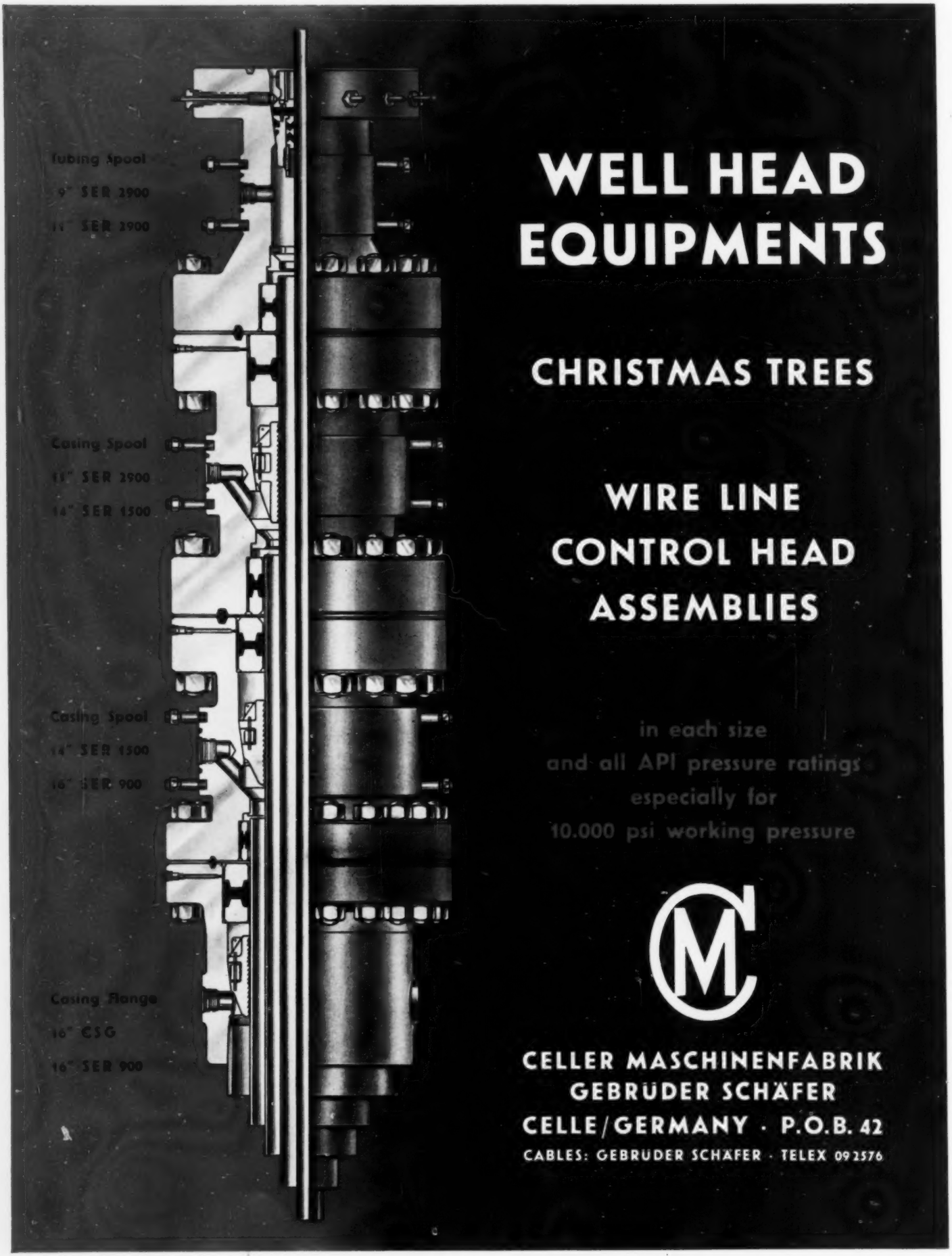
out standing quality

is maintained by constant tests of HÜLS raw materials

HÜLS recommends: plastics · plastics auxiliaries rubber auxiliaries · synthetic rubber „BUNA Hüls" (product of Bunawerke Hüls GmbH, Marl) · lacquer raw materials · detergent raw materials · raw materials for textiles · chlorinated hydrocarbons organic acids and their salts · glycols and glycol derivatives · amino alcohols and other organic products · carbon black · technical gases

Chemische Werke Hüls
Aktiengesellschaft
Marl · Westfalen · Germany

World-Wide Experience Guarantees Economic Exploration of
COAL
SALT
WATER
NATURAL GAS
ORE
CRUDE OIL
GEOLOGY
GEOPHYSICS
DEEP DRILLING
CORE BORING
SHAFT SINKING
UNDERGROUND DRIVAGES
PRODUCTION OF CRUDE OIL
AND NATURAL GAS
C. DEILMANN BERGBAU GMBH
CRUDE OIL AND NATURAL GAS
DIVISION: BENTHEIM
MINING AND SHAFT SINKING
DIVISION: DORTMUND
C. Deilmann Bergbau GMBH
Dortmund, Germany



WELL HEAD EQUIPMENTS

CHRISTMAS TREES

WIRE LINE CONTROL HEAD ASSEMBLIES

in each size
and all API pressure ratings
especially for
10.000 psi working pressure

CELLER MASCHINENFABRIK
GEBRÜDER SCHÄFER
CELLE/GERMANY · P.O.B. 42
CABLES: GEBRÜDER SCHÄFER · TELEX 092576

Hydromin Services to Refiners

Hydrocarbon Mineralöl G.m.b.H. (abbreviated Hydromin), Düsseldorf, Fürstenwall 23, Germany, is an engineering office and was founded in 1950 by the two parent companies, Hugo Stinnes Industrie und Handel G.m.b.H. and Hydrocarbon Research, Inc., New York. The purpose of Hydromin is the planning, construction, erection and initial operation of units in the petroleum industry in close collaboration with Hydrocarbon Research Inc. Hydrocarbon Research makes available process design and the newest developments in modern refinery technology, which serve as a basis for further engineering planning.

Hydromin has at its disposal a staff of competent technical and business personnel, so that it is in position to plan and deliver on schedule turn-key jobs for both complete refineries and for refining units. Well trained and experienced engineers and technicians make up the various departments, such as: construction offices for vessels and condensers; pipelines; pumps and compressors; industrial furnaces; measurement and electro technology, etc. Special departments for purchasing, scheduling and acceptance, serve to prepare construction in such a way that it can proceed without interruptions or delays. Experienced engineers with the necessary knowledge of languages are available for supervision of construction and for start-up operations.

Among the many units erected since 1950, the following are mentioned:

New refinery for the Greek Government in Aspropyrgos/Athens

Large refinery in Cubatao, Brazil, for Conselho Nacional Do Petrole, Rio de Janeiro

Catalytic cracking units in—Heide/Holstein for Deutsche Erdöl A.G., Hamburg

Donges, France, for Raffineries Francaises de Petrole de l'Atlantique and Atlantique Progil Electrochimie

Petitjean, Rabat, Morocco for Société Cherifienne des Pétroles

Gelsenkirchen for Gelsenberg Benzin A.G. Gelsenkirchen, Germany

Cabo Ruivo, Portugal, for Sociedade Anonima Concessionaria da Refinacao de Petroleos em Portugal "Sacor", Lisbon

Units for the reforming of naphthas, thermal cracking, polymerization, desalting, etc. were built for—

Union Rheinische Braunkohlen Kraftstoff A.G., Wesseling near Cologne, Germany

Socony Vacuum Francaise, Paris, France

Raffineries Francaises de Pétrole de l'Atlantique, Paris and Atlantique Progil Electrochimie, Donges, France

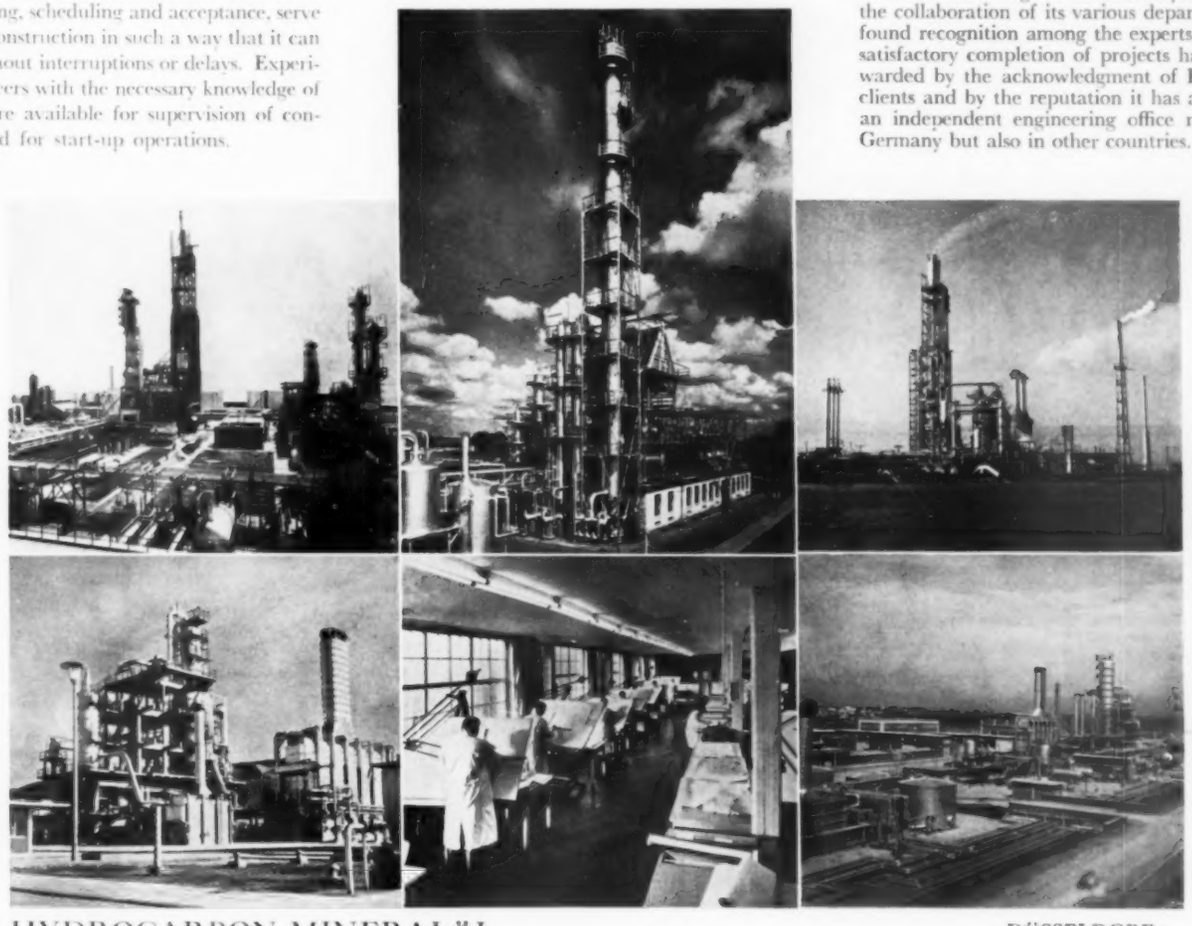
Sociedade Anonima Concessionaria de Refinacao de Petroleos em Portugal "Sacor", Lisbon, in Cabo Ruivo

Mobil Oil A.G., Celle, Germany

Gewerkschaft Deutsche Erdölraffinerie, Misburg, Germany

With the increasing importance of petroleum technology, the working area of Hydromin has been enlarged and extended to petrochemical units, for instance for the production of ammonia, ethylene, oxygen, nitrogen and rare gases. In close collaboration with clients problems have also been solved in the field of solvent and detergent preparation, and units have been erected. The diversified nature of the engineering staff permits the undertaking of jobs such as development of road building and transportation machinery and processing in the nuclear energy field.

The careful organization of Hydromin and the collaboration of its various departments has found recognition among the experts. Fast and satisfactory completion of projects has been rewarded by the acknowledgment of Hydromin's clients and by the reputation it has acquired as an independent engineering office not only in Germany but also in other countries.



HYDROCARBON MINERALÖL
GMBH.

DÜSSELDORF
FÜRSTENWALL 23
GERMANY

gas per day through a four millimeter choke. Both wells are the first Triassic gas finds in northwest Germany. Development of previous Triassic gas discoveries led to a significant increase in drilling similar prospects in 1960. As a result, there was the successful extension well Goldenstedt T 2, 2.4 kilometer southeast of Goldenstedt T 1 producing at about the same rate. Further tests in Triassic reservoirs, such as in well Hoya Z 1 and Hohes Moor Z 1 yielded only a small gas flow.

After a short period (five years) of uncommercial oil production (totaling 6,747 tons) in the Adorf field by well Adorf 1, which was abandoned in 1952, there remains to be mentioned the resuscitation of this oil field by *Adorf Well No. 9*. The interpretation of the electric log of the Zechstein-gas well Adorf Z 7 revealed oil saturation in the upper part of the Bentheim sandstone (Valendis). A structural higher position of the Valendis pay was drilled from Adorf Z 7 in an azimuth of 90 degrees. In preliminary tests the well flowed 58 tons of oil per day. On the very complex structure five successful wells at nearly the same rate have been drilled to the end of September, 1960.

Southsouthwest of Rheine the dolomitic rocks of the Zechstein were objectives of *Neuenkirchen Well No. 2*, near the outcrop on the rhenish massif. The Platten-dolomite was in a limy facies and nonporous. Some tests on this horizon and sandstones of the Carboniferous yielded saltwater only.

Area Between North German Lowland and Molasse Basin: In the prospective area of the Solling, the Hessian Basin and the Swabian-Franconian Jura, where predominantly Mesozoic beds are exposed, the targets of drilling were Upper Permian (Zechstein) and older strata, with four wells, two of which were drilling at the end of the year.

In the central part of the Gottingen graben and northeast of the potash mine Konigshall-Hindenburg, *Northeim Well No. 2* was located on a seismic high in a search of oil/gas possibilities in the prospective main dolomite. This well will contribute valuable information to the facies development of the main dolomite, since the previous well Northeim 1, at the anticline of Ahlshausen hit the prospective horizon in the facies of Stinkchiefer and Stinkdolomite respectively. The well had not reached its objective early in December, 1960.

Upper Permian maindolomite and prospective horizons within the underlying beds (Rotliegend and Carboniferous) are targets of *Dransfeld Well No. 1*, about 14 kilometers WSW of Gottingen. The well started drilling early in November.

At the upper Main river between Bayreuth and Würzburg well *Eltmann 1* was drilling to investigate facies conditions of Permian and underlying beds. The Platten-dolomite was thin and showed little porosity. Rotliegend and Upper Carboniferous were not present due to transgressive overlap of Weissliegendes (Permian) on a sequence of quartzites and quartzitic shales of probably Devonian age. Drillstem-tests on the Plattendolomite and sandstones near the base of the Lower Buntsandstein were dry.

In the southwestern area of marine Zechstein sediments east of the Weingarten oilfield drilled *Neibsheim Well No. 1* in search for oil or gas possibilities in the Zechstein and deeper beds. Reservoir rocks or showings were missing in the Zechstein, which, however had a thickness of only 11 meters. The well drilled from the Zechstein into the Rotliegend sandstones, in which it was abandoned at 1,341 meters.

Saar-Nahe Trough: Exploration in this region, with objectives in the thick limnic-fluviatile beds of the Rotliegend (Upper Permian) and the Carboniferous was reduced in 1960. Two previous wells (Monzingen 1, Landstuhl 1) were abandoned early in 1960. There were some showings of oil and gas in the Monzingen well but all tested dry.

The Upper Rhine Valley: Exploratory drilling in this area was at a slower rate than in 1959, with the drilling of only 9 wells, of which no well was successful.

In the northern part of the graben the sandy beds at the base of the Tertiary and higher zones in the Aquitanian were drilling objectives. In the southern part of the Upper Rhine graben, on the other hand, several wells were drilled with Jurassic and Triassic targets. Most of the tests were drilled on structures investigated by seismic methods in the central part of the graben, and only a few were located near the margins.

The Landau oilfield developed into an important area. With five producing sands in the *Bunte Neiderröderner, Cyrene marls, Meletta beds, Pechelbronn beds, Fish shales, Upper Muschelkalk, Sands at the base of the Lymnea marls*, and the *Lettenkohle Keuper* this field produced about 123,000 tons as compared with 89,000 tons in 1959.

The Molasse Basin: The discoveries of oil and gas during last years led to increased drilling activity in 1960. 24 exploratory wells were drilled, one of which found a new oilfield and one of which found gas. Nearly all the tests had as their main objectives some sandstones or limestones at the base of the Tertiary Molasse beds, but some wells investigated the underlying Mesozoic.

An important wildcat near the western end of Lake Constance *Dingelsdorf Well No. 1*, drilled underneath transgressive Tertiary with Bohnerz at the base of the Lower Freshwater Molasse into a normal and undisturbed sequence of Malm, Dogger, Lias, Trias and thick clay and sandstones of the Lower Permian (Rotliegend). Questionable Lower Rotliegend and Upper Carboniferous was found in unconformable contact (at about 2,648 meters) on basement of Granite. Some showings of oil are reported from the Lower Molasse beds. An open hole test of the Liassic alpha sandstone saturated with oil yielded an influx of drilling mud without oil or gas. The well was abandoned after an unsuccessful open hole test of several gas and oil showings within a sandstone of the Upper Carboniferous.

The discovery of oil in the western part of the Molasse Basin north of the Lake Constance is one of the outstanding events of the year 1960. The wildcat Markdorf-Oberteuringen 1 is located on a monoclinal structure and it is the first well which found the lower liassic and rhaetic sands to be present and oil and gas bearing in the Molasse Basin. An open hole test of the oil-impregnated Rhaetic sandstone resulted in a gas flow of about 120/130 liters per minute with some oil. A following swab-test produced about five cubic meters of oil with 10 cubic meters of water. After MCA-acid treatment the well yielded about 6 cubic meters of oil per day without water. Definite production tests of the upper Liassic pay and the results of further extension wells remain to be waited for until valuation of this new oil discovery can be given. Untested are sandstones within the Lias-alpha beds. The well substantiated the presence of good shows of oil and gas at the base of the Lias and within the Rhaetic. It is assumed that this result will stimulate further drilling activity in this part of the Molasse basin.

North of the folded subalpine Molasse zone a seismic high northeast of Lindau (Lake Constance) was investigated by well *Opfenbach 1*, which yielded interesting new subsurface and palaeogeographical information. Here, basal parts of the Molasse beds and Mesozoic strata below the unconformity of the Tertiary were targets. The well drilled a thick Tertiary section (3,660 meters), then found the Malm unexpected thick (about 575 meters). Parts of the Malm were found developed in a thick bituminous alpine facies (Quintener limestone) with showings and saturation of light oil. Good reservoir conditions were encountered within the Personaten sandstone (Dogger beta), which, however is watered. At the beginning of the month of December the well was drilling Muschelkalk at a depth of 4,495 meters.

The successful well *Anzing 1* was drilled on a seismic high south of the Hohenlinden-Anzing fault. Tests of the Anzing sand (Rupelian) yielded 3,600 cubic meters of natural gas per hour. Testing of the Lithothamnian limestone showed high pressure after acid treatment.

A very significant oil discovery was made northeast from Munich and south of the northeast striking Landshut-Neuotting high. On a seismic structure 20 km. northwest of the Ampfing oil gas field, *Velden Well No. 1* encountered an undisturbed section of the Tertiary with transgressive overlap of Ampfing beds on Upper Cretaceous (Coniac). Gas shows are reported in parts of the Lattorf fish shales and Litthothamnian limestones respectively. Fine to coarse-grained sandstones (0.9 meters thick) at the base of the Lattorf Ampfing beds are oil-bearing. On test the well yielded about seven cubic meters of oil (0.903 specific gravity) per day. Extension well *Velden 2*, about 2.8 km. east southeast of the discovery well hit the pay in a thickness of about two meters and yielded 430 tons in the month of July. A further successful extension well was completed as a producer 5 kilometers ESE from the discovery well.

MARKETING:* The current increase in oil consumption in West Germany is far above the average of the free world as a whole. Since 1957 the sales on the German market have more than doubled, amounting to about 23.7 million tons of finished products in 1959. In 1960 a total consumption of 30 million tons (including the refineries' own needs) may be surpassed which means a rise of about 25%, compared with the previous year. The upward trend refers mainly to fuel oil, but is also considerable with regard to motor gasoline, diesel oil, asphalt, and LPGas as well as other special products.

*Review by A. M. Stahmer, Erdoel-Informationsdienst, Hamburg.

(Continued on page 114)

MAGIRUS
DEUTZ

SHIP OF THE DESERT

The Magirus-Deutz URANUS with oilfield equipment is a modern „SHIP OF THE DESERT" for heavy load transportation. Three driven axles secure great traction power when crossing impracticable terrain. Even under most difficult conditions, you may rely upon this vehicle, due to its reinforced HD execution. The multi-purpose URANUS has given best results in the Arabian and African deserts. The outstanding features of the aircooled 12-cylinder 250 PS Deutz-Diesel engine are:

INSENSIBILITY AGAINST HEAT · LONG LIFE

Write for detailed information

KLÖCKNER-HUMBOLDT-DEUTZ AG · WERK ULM · WESTERN GERMANY

(Advertisement)

Daimler-Benz AG Stuttgart-Untertuerkheim

A move towards the oil-drilling plant of the future

This contribution touches up on some of the problems associated with the various systems of power-transmission used for oil-drilling plants, and in particular it describes the three phase torque conversion transmissions which are the latest development in this field. The conclusion which presents itself when this type of transmission is considered is that a return to the "central energy producing plant" which existed formerly in the case of steam transmission is on the way.

In the last two decades the power requirements relating to oil-drilling have approximately doubled, and ever greater demands are made on the operators in consequence of the complicated power transmission and distribution plants. The greater power requirements result in the main from drilling being carried out at greater depths and larger pumps being used. There is also the urge to reduce drilling times, which in turn demands more power. In addition to the power increase for the actual drilling equipcent, e.g. for the pumps, hoists and rotary table, there are also greater power requirements for supplementary and auxiliary equipment such as sand removers, gas separators, centrifuges and compressed air production plants.

The final result of this development is in many cases diversified machinery with various sizes and types of engines. To what has been said above must be added the structure of the installation has been complicated and the costs of the mechanical or hydraulic power transmission elements have risen considerably, so that in many cases they are disproportionate to the expenditure for the entire plant.

It is a very difficult matter to reduce the complexity of the plants, since there are such differences between items of equipment bought in the last ten or fifteen years that holding adequate stocks of spare parts and maintenance of the plant have become real problems. This is particularly so in the case of large oilfields and on sites overseas where there is often the added complication that the oil company has to contend with difficult transport conditions and a labor force with a low level of technical experience.

In the days when steam-operated drilling plants were used, the various prime movers for all operations of the drilling plant, such as hoists, drills, pumps and the auxiliary machinery, were supplied from a central source of power, the boiler. There were no difficult power transmission problems, for there were only simple pipe connections between the various prime movers and the boiler. Every supplementary requirement or increase in power could be met up to the point when the full capacity of the boiler had been reached.

The introduction of the diesel engine led to "power transmitting plants" which took the place of the steam piping. In the drilling plants hitherto the diesel engine drives a chain compound which distributes the power by way of vee belts or flexible shafts to the various machines to be driven. As power requirements have increased, this part of the drilling plant has become ever more complicated and expensive, both as regards first costs and as regards maintenance and operation. Power transmission plants according to the purely mechanical system, the hydraulic system, or the direct-current Leonard principle are never as flexible and undemanding as steam plants. Every addition made to the transmission plant with a view to attaining the desired characteristics such as are given by steam operation increases the complexity and the costs.

On behalf of Dutch Shell, the Siemens-Schuckertwerke Erlangen, in conjunction with the Daimler-Benz Company Stuttgart and the Voith Company, Heidenheim, have now developed a three-phase torque convertor transmission. This plant is constituted as follows:—

A number of diesel alternator sets are run in parallel, the number depending upon the power requirements of the drilling plant. The three-phase motors of the drilling plant and of all ancillary machinery take their current from one single-bus-bar. The power requirements are distributed uniformly over all the generating sets by way of the bus-bars. The three-phase motors drive the drilling machinery, pumps, hoists, etc., by way of torque convertors with variable guide vanes.

The three-phase current torque convertor transmission has been known since the war but it was not until the successful development in recent years of the torque convertor with variable guide vanes that it was possible to build convertors ranging up to 2000 HP. It is the combination of a squirrel cage induction motor, which is about the most reliable type in existence, and a torque convertor, which reaches its maximum efficiency at an input speed of 1760 rpm, and which also is extremely reliable if properly handled, which renders possible for the first time a driving unit which is low in weight and simple to operate. The regulation of the speed and thus the regulation of the torque to be transmitted is effected by simple setting of the guide vanes. Light three-phase motors of 60 cycles per second and with a speed of 1000—1800 rpm are readily available in the market and represent no special development.

The Daimler-Benz Company, which manufactures diesel engines ranging from 30 to 3000 HP and supplies them all over the world, includes also engines for diesel-hydraulic oil drilling plants among its products, and we will now describe briefly a plant which has been constructed for three-phase torque convertor transmission with two diesel generating sets (see illustration on lower right).

As prime mover is used a high-speed 12-cylinder four-stroke diesel engine of type MB 820. Both this 12-cylinder vee-engine and the 6-cylinder in-line engine have already proved their worth under the most difficult oil-drilling conditions. The engines of this series cover a power requirement ranging from approximately 230-2910 HP at a maximum speed of 1500 rpm and may be overloaded to meet the purpose for which they are used.

Engine MB 820 Bb is supercharged and in this

(Advertisement)

Survey of types and technical data

Type		Cooling system	Number of cylinders and arrangement	output in HP [1] for 24 hours constant operation	Engine speed rpm	Cyl. bore mm/in	Stroke mm/in	Piston displacement l/cu in	Mean piston speed (fps)	Mean eff. press. kg/cm²/lb/sq in	Dimensions					Weight kg/lb	Weight/Power ratio kg/lb/HP	Type starter
											Length mm/in	Width mm/in	Height h mm/in	Height h^1 mm/in	Height h^2 mm/in			
MB 836	B	W	6/S	230 275 315	1000 1200 1300	175 6.89	205 8.08	29,60 1806.5	10,25 33.6	6.40 91	2120 83	1065 42	1535 60.5	1026 40.5	509 20	1900 4190	6.0 13.2	el. Dair.
	Bb ■		6/S	305 365 400	1000 1200 1500					8.10 115	2230 87.8	1065 42	1665 65.5	1156 45.5	509 20	2100 4630	5.25 11.5	el. Dair.
	Db ●		6/S	350 425 455	1000 1200 1500					9.25 131	2325 91.5	1120 44	1665 65.5	1156 45.5	509 20	2290 5050	5.0 11	el. Dair.
MB 820	B	W	12/V	460 550 630,	1000 1200 1500					6.40 91	2355 93	1364 53.5	1555 61	1003 39.5	552 21.5	2620 5780	4.15 9.2	el. Dair.
	Bb ■		12/V	610 730 800	1000 1200 1500	175 6.89	205 8.08	59,20 3613.0	10,25 33.6	8.10 115	2355 93	1364 53.5	1955 76.5	1403 55	552 21.5	2960 6530	3.7 8.2	el. Dair.
	Db ●		12/V	700 850 910	1000 1200 1500					9.25 131	2355 93	1400 55	2007 78.5	1455 57	552 21.5	3120 6880	3.4 7.5	el. Dair.

Notes.

W = water cooling
S = vertical, in line
V = vee
el = electric starter
Dacr = pneumatic starter, (pneumatic motor)
■ = with exhaust gas turbo-supercharging
● = with exhaust gas turbo-supercharging and supercharged air cooling
h = total height
h_1 = from crank shaft centre to upper edge
h_2 = from lower edge to crank shaft centre
1) = reference data: air pressure 28.9 in mercury, air temperature (engine intake) 68°F, relative air humidity 60%
2) = at maximum rpm
3) = related to constant operation
4) = Basic engine, ready for operation, dry, but without starter, dynamo, etc.

new type of transmission supplies 730 HP at 1200 rpm in continuous operation and may be overloaded to 830 HP for one hour in every six (either intermittently or continuously) and may be overloaded to 930 HP for some seconds. This overloading reserve is intended to take up the starting peaks of the three-phase motors when they are switched on. In order to limit the overload periods of the diesel engines, an excess current relay is incorporated in the switch gear and after a certain time this releases the generator switch and thus protects the engine from overloading damage. The diesel engine is started by means of a pneumatic motor because there is always compressed air available on the drilling site. The use of electric starters is contrary to the regulations of the mining authorities.

The engine is connected to the generator, make SSW, 500 kW, 60 cycles, 980 V, by way of an elastic coupling and is mounted rigidly on a very stable sledge-type frame on runners. The engine accessories such as oil bath air filters, preheating device for cooling water and oil, prepumping plant and the engine instruments are mounted on or in the base frame. The engine cooling water is cooled by means of a honeycomb radiator with an hydrostatically driven ventilator.

A sheet metal-casing with doors which open upwards at the sides encloses the entire unit and protects it from the weather. A folding gangway for the service personnel is provided on each long side of the unit.

The dimensions of the complete generating unit are—length: 216″ (5.4 metres) height: 96″ 2.4 metres and width: 68″ (1.7 metres), Weight about 12 tons.

A joint switch gear which is also mounted on a single frame on runners with a weather-proof sheet metal casing allows of three generating units being run in parallel.

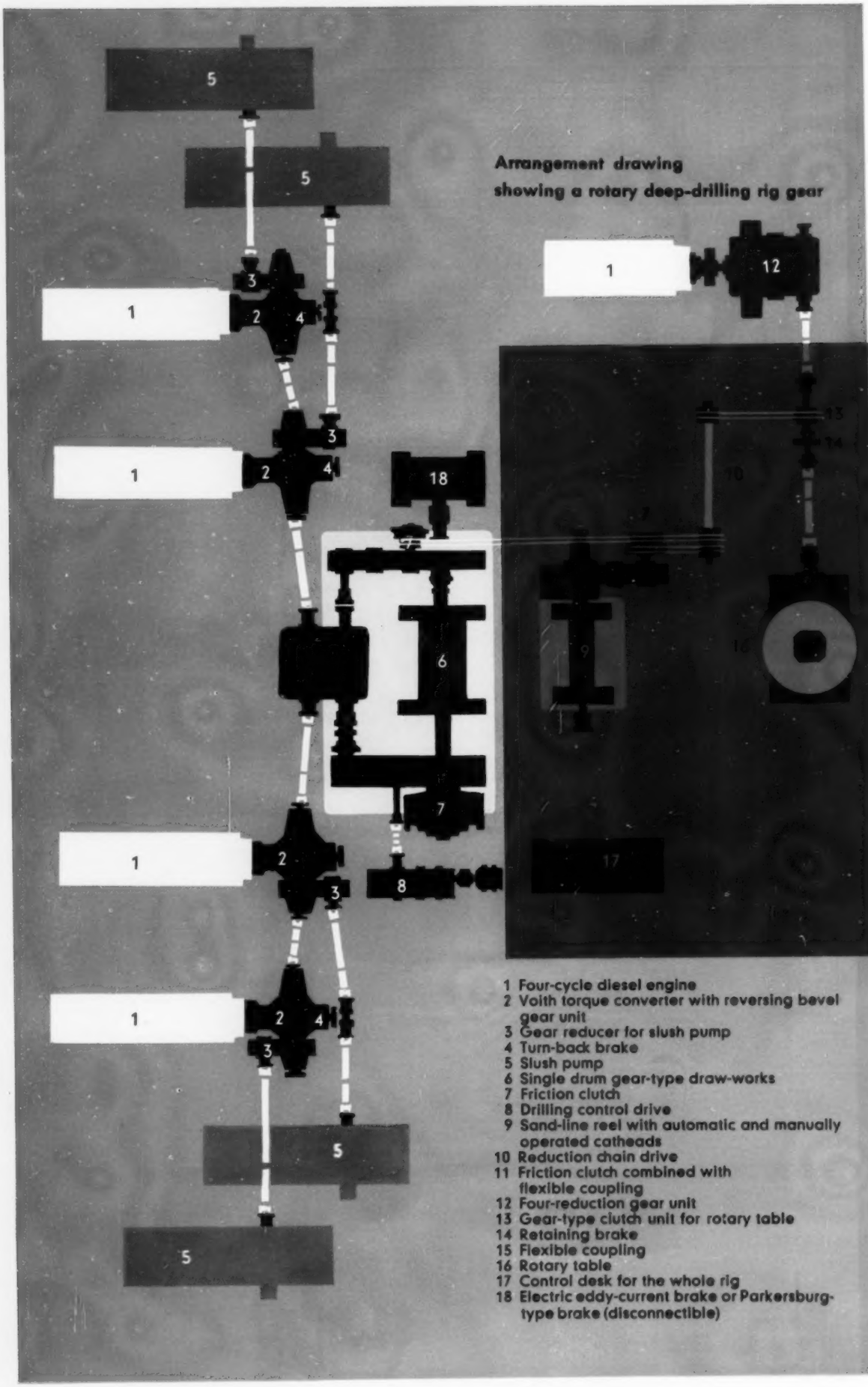
The installations with mechanical or hydraulic power transmission which have been in common use hitherto are fairly well known and have been touched on only briefly in this article. Since however not a great deal is known at present regarding the advantages and disadvantages of the three-phase torque convertor system, below is attempted a short survey based upon particulars supplied by experts:—

Advantages

1) Low initial cost and low weight in comparison with conventional plants.
2) Maximum interchangeability of the electric motors, generators and diesel engines.
3) Simple electrical equipment.
4) Simple operation of the torque convertor.
5) Generator sets having different speeds but the same frequency and voltage may be operated in parallel.
6) All auxiliary machinery can be driven off the main generating sets.
7) Uniform distribution of load over all the generating sets.
8) Low maintenance cost and easy assembly.
9) Ideal torque curve.
10) Central supply of several drilling rigs is possible.

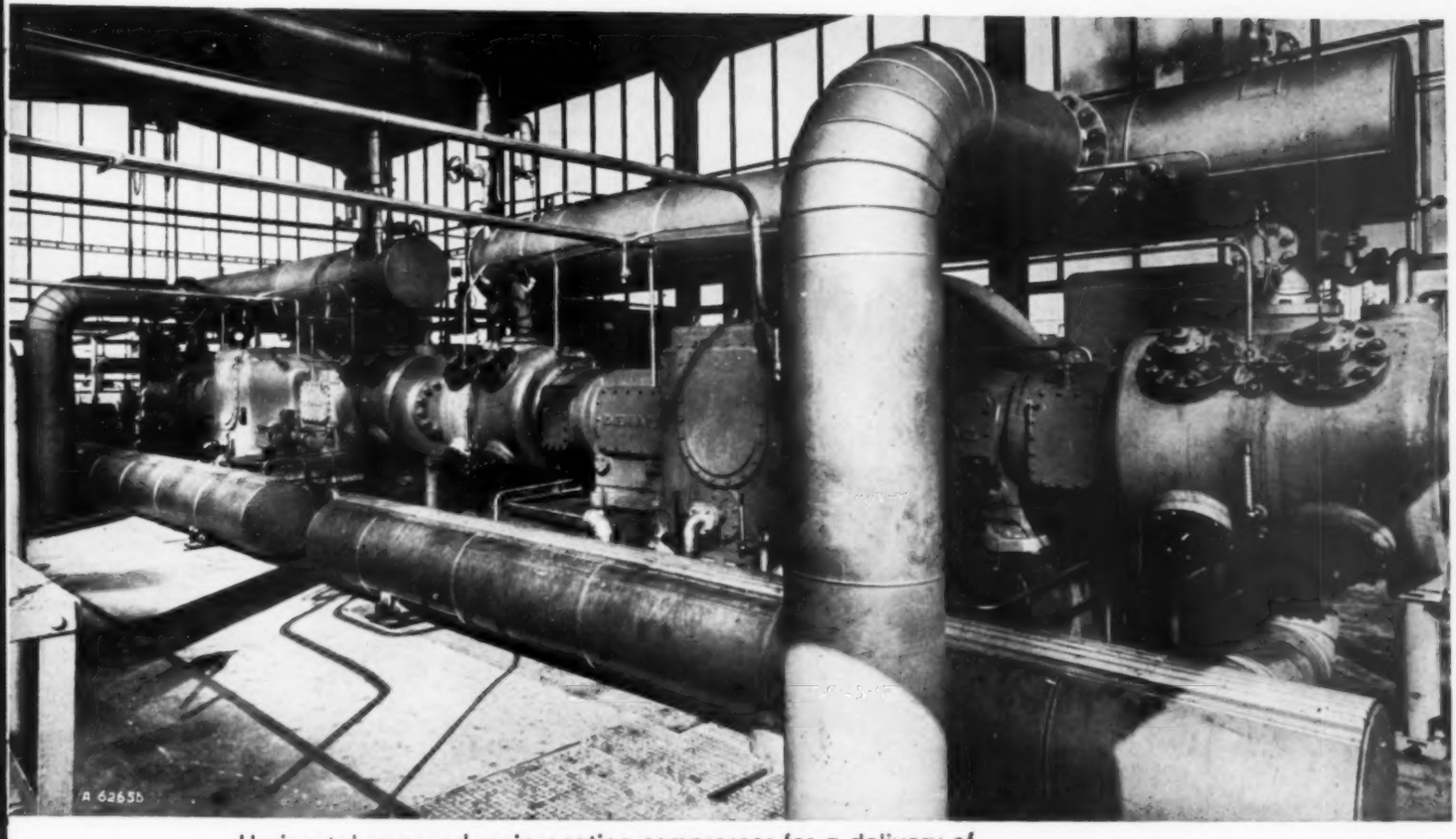
The only disadvantage which has been revealed hitherto is the total degree of efficiency of approximately 65%, while in the case of mechanical transmission this is rated at about 80%, and with hydraulic transmission at about 70%.

In technical circles it is considered that the combination of the diesel engine and the three-phase torque convertor transmission will become a regular feature of progressive oil-drilling plants.


5
5
3
1
2
4
3
1
2
4
18
6
7
1
2
3
8
1
2
4
3
5
5
Arrangement drawing
showing a rotary deep-drilling rig gear
1
12
13
14
10
9
16
17
1 Four-cycle diesel engine
2 Voith torque converter with reversing bevel gear unit
3 Gear reducer for slush pump
4 Turn-back brake
5 Slush pump
6 Single drum gear-type draw-works
7 Friction clutch
8 Drilling control drive
9 Sand-line reel with automatic and manually operated catheads
10 Reduction chain drive
11 Friction clutch combined with flexible coupling
12 Four-reduction gear unit
13 Gear-type clutch unit for rotary table
14 Retaining brake
15 Flexible coupling
16 Rotary table
17 Control desk for the whole rig
18 Electric eddy-current brake or Parkersburg-type brake (disconnectible)

DEMAG

equips every industry



Horizontal opposed reciprocating compressor for a delivery of 37,500 scfm of hydrogen to be compressed from 295 to 490 psia

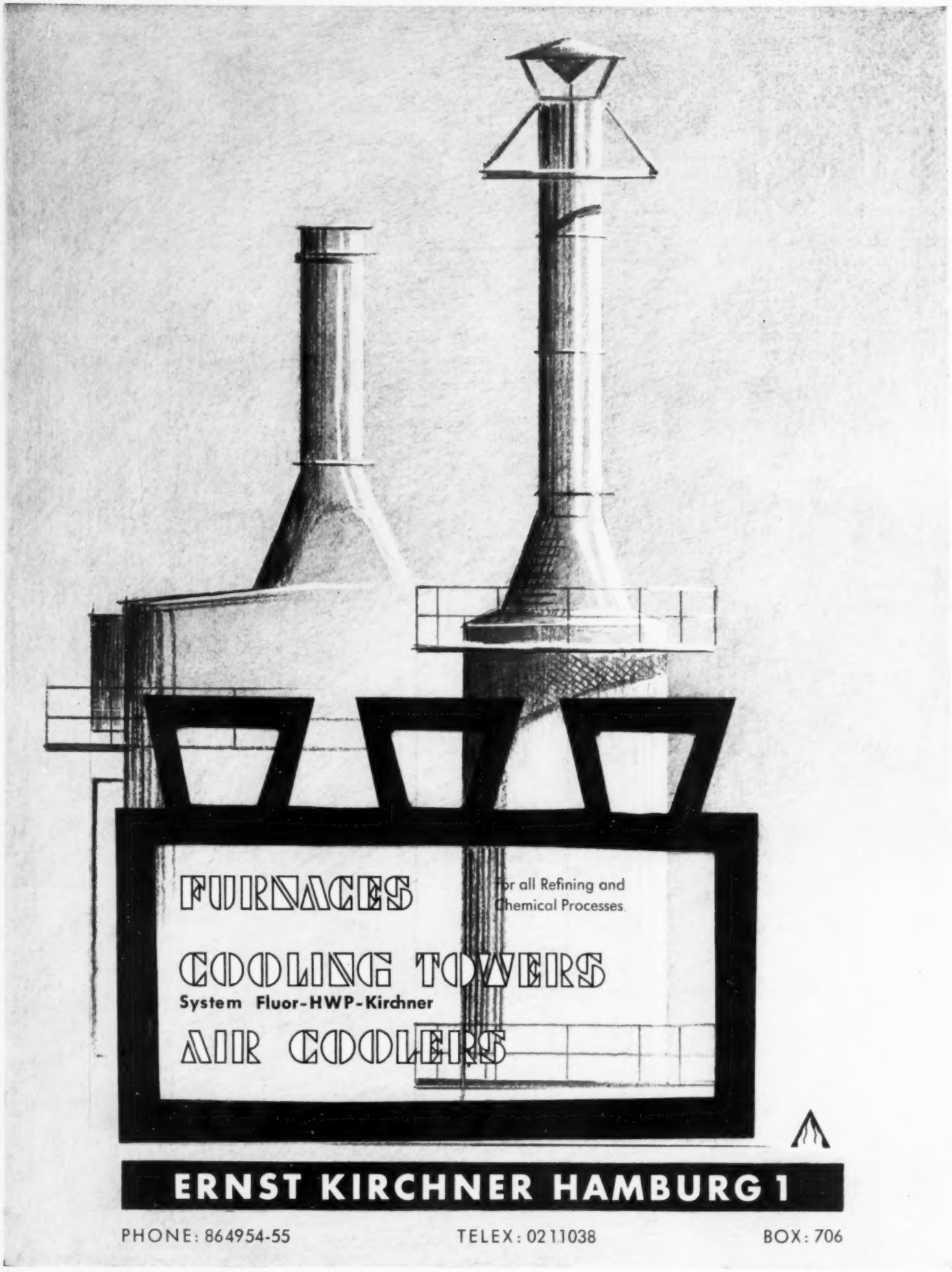
Deep-drilling rigs and compressors

Our gear-type drilling rigs for operations to a depth of 20,000 ft. have proved their value at many oilfields. They are equipped with heavy-duty gear units instead of chains, and with torque converters. They are built according to the "unit construction" principle, permitting the layout of the machinery to be varied in many different ways.

For use in oilfield and refinery operations, we supply reciprocating and turbo compressors for all kinds of gases and for all deliveries and pressures.

U. S. Representatives: AMERICAN DEMAG CORPORATION, one Gateway Center, Pittsburgh 22, Pa.

DEMAG AKTIENGESELLSCHAFT DUISBURG GERMANY


FURNACES
For all Refining and
Chemical Processes
COOLING TOWERS
System Fluor-HWP-Kirchner
AIR COOLERS
ERNST KIRCHNER HAMBURG 1
PHONE: 864954-55
TELEX: 0211038
BOX: 706

Tanks of different sizes with cone or floating roof,
Fractionating towers,
Reactors,
Distillation columns,
Cracking towers,
Absorbers,
Pressure tanks,
Spherical gas tanks,
Heat exchangers,
and all steel construction for these installations.

THEODOR GRÄBENER
WERTHENBACH KR. SIEGEN

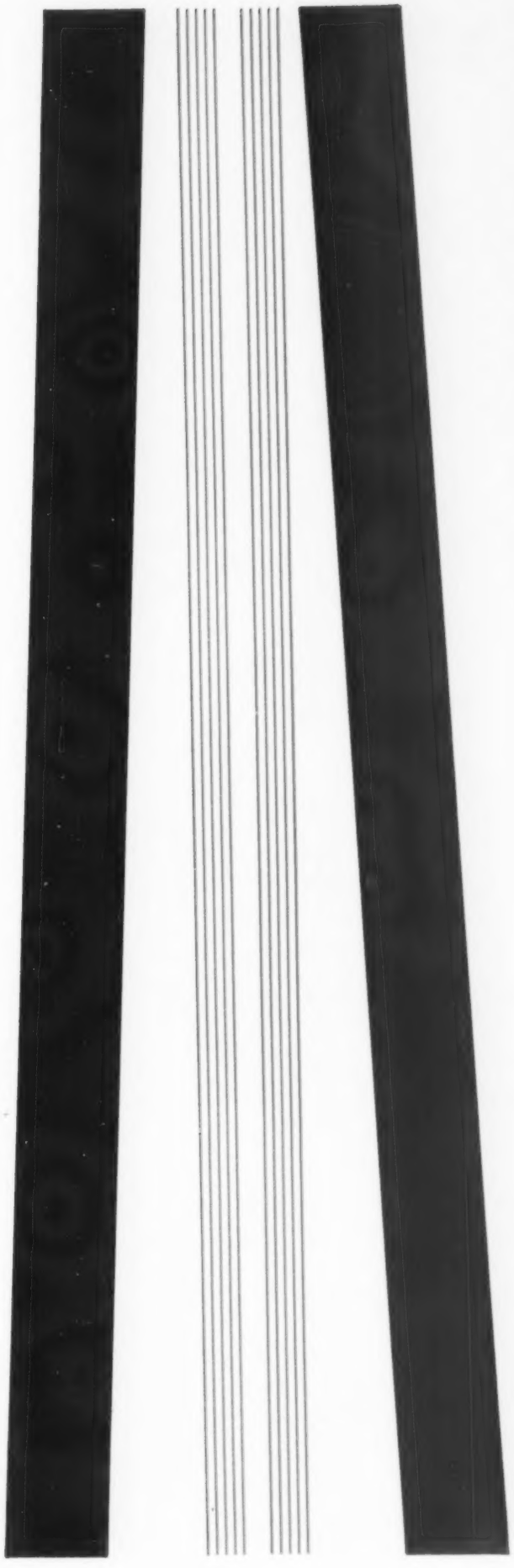
For the

OIL INDUSTRY

Thermocouples
Compensating leads
Resistance thermometers

in many forms specially suited to individual working conditions.

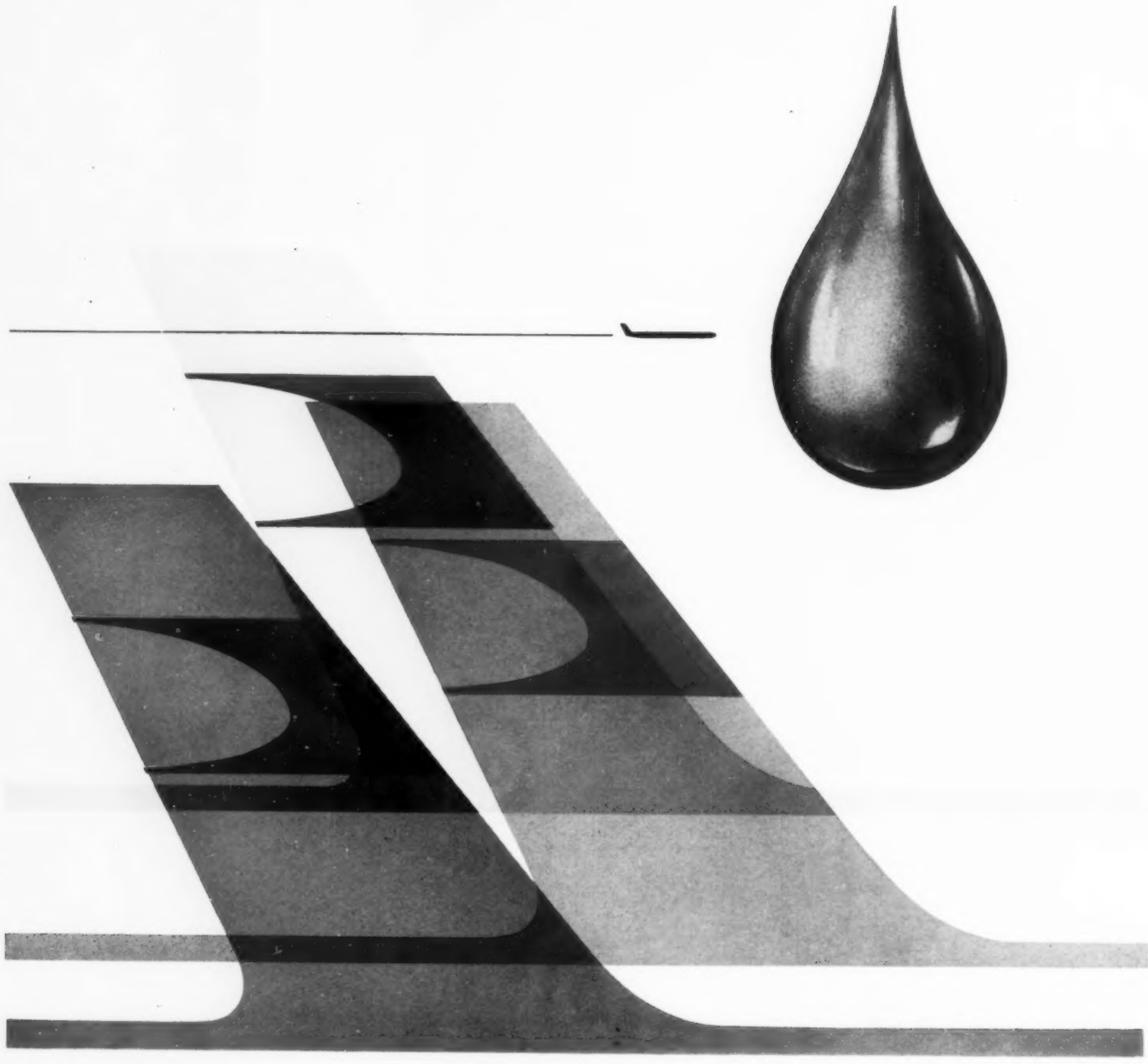
DEGUSSA
HANAU
GERMANY



DEUTSCHE
SCHACHTBAU- UND
TIEFBOHRGESELLSCHAFT M. B. H.

DRILLING
AND
CRUDE
OIL
EXPLOITATION

LINGEN-EMS GERMANY

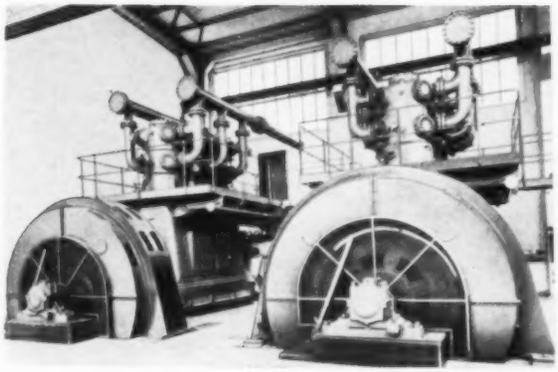


jet between world oil centers

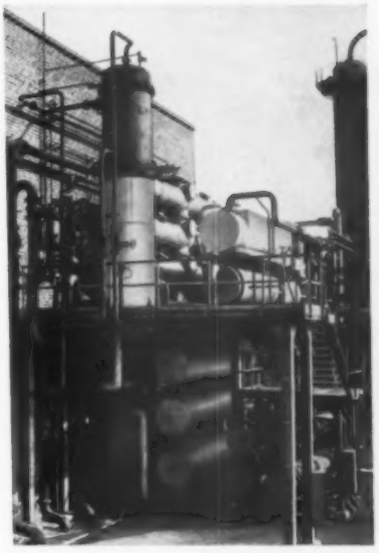
Lufthansa 707 Jets offer fast flights between North America, Europe, Near, Middle and Far East. Enjoy exclusive Senator Service featuring finest wines, liquors and à la carte meals in First Class at no extra fare, or thrifty Economy Class. See your travel agent or Lufthansa offices in principal cities of the world.

LUFTHANSA
GERMAN AIRLINES

Fractionating columns, total-weight incl. internals 985 tons, made and erected by BORSIG, Berlin, for a crude oil distilling plant; highest atmospheric tower 155 ft, outside dia 13 ft, weight 100 tons



Non-lubricated recycle gas compressors of a refinery in Western Germany. Capacity 57,700 scfm each, suction pressure 440 psia, discharge pressure 725 psia, power consumption 2850 HP each



Total view of a BORSIG absorption refrigerating machinery operating on waste heat of oil, for cooling liquid hydrocarbons. Capacity: 232 tons of refrigeration at 28/104° F

Power Station 60 MW

9098 48 A e

BORSIG

supplies for the petroleum industry

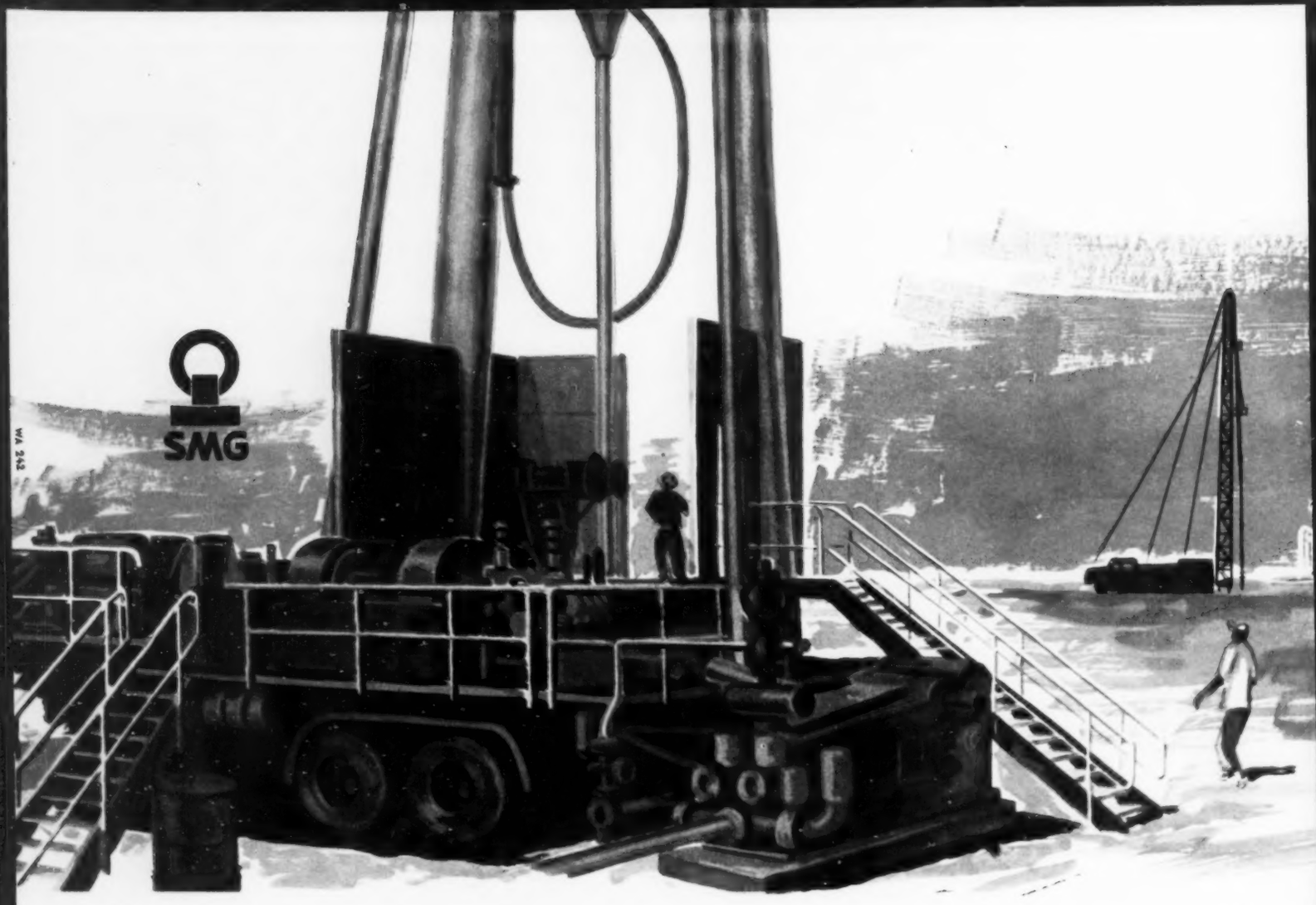
Heavy Apparatus
Reactors, fractionating towers, reboilers, heat exchangers, chillers, pressure vessels, pipework.
With application of all normal, alloyed and plated steels for operation under pressure and vacuum, electrically hand and/or machine welded (Elira and Arcatom procedures), X-rayed, stress-relieved, with ultrasonic inspection or magnetic particle test.
To all German and foreign specifications and codes (e.g. ASME, TEMA, Lloyd's Register, etc.).
With joint efficiency 80, 90 and 100% or First Class Welding Certificate.
Field assembly and erection of apparatus and plants by highly skilled specialists.

Gas and Air Compressors
horizontal, vertical and angle type, for all pressures and capacities. Special compressors (non-lubricated) for petroleum refineries. Natural gas compressors. Portable compressor sets for oil field applications.

Industrial Refrigerating Plants
any kind, operating on all refrigerants. Piston and turbo compressors, condensers, evaporators and coolers. Low-temperature cooling equipment for liquids and gases. Low-temperature gas liquefying plants. Absorption refrigerating plants, single and multi-stage, e. g. for waste heat recovery. Refrigerating plants for water recooling and air conditioning.

Steam Power Plants
Co-ordinated planning, design and construction of complete plants. Superintending of all job site work. Consulting engineering on all problems of heat economy. Waste heat recovery, feedwater economy.
All major parts such as boilers, turbines, pipework, HP gate valves, preheaters and vessels manufactured in own shops.

BORSIG AKTIENGESELLSCHAFT · BERLIN-TEGEL



For the future, a further remarkable rise can be foreseen. According to forecasts of the major oil companies total consumption (including bunker oil sales) will be around 36 million tons (about 720,000 b/d) in 1962 and 42 to 43 million tons in 1965 (about 840,000 to 860,000 b/d).

REFINING:* These consumption figures make it understandable why new refineries are being built and why several existing plants are increasing their crude intake capacity to meet demand. Besides the established oil companies which participate in refinery production some newcomers which up to now did not share in the West German oil market are considering their chances for gaining ground in Germany or have already decided to erect refining plants of their own. The latter is the case with the Swiss, Gottlied Duttweiler, who with the help of the American Independent Oil Co., has already completed a new refinery at Emden on the North Sea coast, and with the Italian Ente Nazionale Idrocarburi which plans a refinery in Ingolstadt on the Danube river.

In 1960 three new refineries were put on stream: Deutsche Shell AG's refinery at Godorf near Cologne with an annual capacity of 4 million tons (30,000 b/d), the plant of the German affiliate of British Petroleum Co. near Dinslaken (Lower Rhine) with a crude throughput potential of 4.5 million tons a year (90,000 b/d), and the previously mentioned refinery of Erdoelwerke Frisia AG (Duttweiler) at Emden with an annual intake capacity of 1.5 millions tons (30,000 b/d).

The Godorf refinery of Shell started production in May 1960 when also the 180-mile crude pipeline from Rotterdam to Wesel and Godorf which links the plant with the North Sea coast was completed. At Godorf all fractions from the thermal distilling, except heavy residue oil, are passed through a hydrosulphurizer. This plant which operates on hydrogen from catalytic reforming, is followed by a Claus plant with bauxite reactors for the production of liquid sulphur. Propane, butane and ethane arise in the gas separation process. In a UOP platformer the naphtha cut from distillation is treated.

The new Dinslaken refinery of BP is situated north of the Ruhr-District near the Rhine. Two groups of plants have been erected or are under construction: the fuel oil refinery which was put on stream in June 1960 and the cracking and bitumen plants which will probably be commissioned in mid 1961. Connected up behind is the works of Erdoelchemie GmbH at Dormagen (affiliate of BP and Farbenfabriken Bayer), which receives 260,000 tons of light gasoline annually from Dinslaken for the production of petrochemicals. Crude for the Dinslaken refinery is pumped through the pipeline from Wilhelmshaven to the Ruhr District. Two distillation units of the refinery have an intake capacity of 50,000 b/d each. Primary gasolines recovered from distillation are treated in a UOP-platformer, the capacity of which amounts to a throughput of 12,000 b/d. Hydrogen from the platformer is used in the hydrofiner for desulphurizing the gas oil. The potential of the hydrofiner amounts to 480,000 tons intake a year. Further units are the Clausplant, the gasoline sweetening plant and the LPGas separating plant. The Kellogg UOP catcracker, which is under construction, operates according to the fluid system and has an annual intake capacity of 500,000 tons of distillate from the vacuum distillation unit connected up front. A bitumen plant with an annual output of 100,000 tons is erected additionally.

The refinery of Erdoelwerke Frisia AG at Emden started operation in September 1960. Input capacity of the plant, built by the Ralph M. Parsons Co., is 30,000 b/d. In addition to a distilling plant, there is a catalytic reformer on the Sinclair-Baker system having a throughput capacity of 190,000 tons per annum and a desulphurizing plant for medium distillates with an annual capacity of 200,000 tons. Crude comes from the Neutral Zone and partly also from Soviet Russia.

Late in 1960 a considerable extension of the refinery of Gewerkschaft Erdoel-Raffinerie Deurag-Nerag at Misburg near Hanover was completed. The crude intake capacity, which was formerly 800,000 tons, was increased to 1,300,000 tons annually. Misburg is treating

*Review by A. M. Stahmer, Erdol-Informationsdienst, Hamburg.

You reach OIL earlier with "SALZGITTER"
SALZGITTER-Gulliver-Full View-Masts
with max. rated static hook loads API 600 000 lbs. are the sky-scrapers of modern oilfields.
SALZGITTER Trailer-Mounted-Drilling-Rigs
FB 415 for 9.000 ft depths cut erection time. Are ready for drilling in two hours. Spare drilling costs.
SALZGITTER-Servicing-Units
are quick, economical, and technically up to date. You can put them for workover-, completion, and drilling work.
Oilfield-Engineers like cutting down transportation and erection time, drilling and production costs.
Do like them!
Follow the "Salzgitter-Line"
SALZGITTER MASCHINEN
AKTIENGESELLSCHAFT · SALZGITTER-BAD
3441
telex: samag sgtr 0953885
samag
HUMMEL

crude from the indigenous oil fields in Lower Saxony.

The planned crude pipeline from Marseilles to middle Europe will have its terminals at Strasbourg (France) and Karlsruhe (Germany). The participating companies intend to commission the pipeline in the beginning of 1963. This is also the date when two new refineries at Karlsruhe will be completed: the Esso AG Plant and a second one by a consortium in which Deutsche Erdoel-AG, Gelsenberg Benzin AG, Mobil Oil AG, Wintershall AG and Scholven-Chemie AG participate. The Esso refinery at Karlsruhe is to have a throughput capacity of 3.5 to 4 million tons annually (about 70,000 to 80,000 b/d), while the consortium's refinery has a projected capacity of 2 million tons annually (40,000 b/d, approx.)

Ingolstadt on the Danube river in Bavaria may become another refining centre in Germany. Suedpetrol AG, an affiliate of Ente Nazionale Irocarbur, and some German banks, intend to build up a refinery there which will be linked to a crude pipeline from Genoa crossing the Alps. Esso as well as Shell also plan a refinery each in the neighbourhood of Ingolstadt. Each of these three plants are to have a preliminary crude intake potential of about 2 million tons annually (approximately 40,000 b/d) each. Dates have not yet been announced for the beginning of construction and the completion of these refineries.

In 1959 production by the German oil refineries amounted to 21.3 million tons, (about 426,000 b/d) of which 8.6 million tons were fuel oil and 4.4 million tons each were motor gasoline and diesel oil. In 1960 a total yield of 27 to 28 million tons (540,000 to 560,000 b/d, approx.) is foreseen.

OPERATING REFINERIES IN GERMANY
(As of January 1, 1961)

BP BENZIN UND PETROLEUM AG, Dinslaken, West Germany.
New 90,000 b/d refinery completed in 1960. Facilities include vacuum distillation, 17,500 b/d; fluid catalytic cracking, 10,000 b/d; Platforming, 10,000 b/d; asphalt, 3,000 b/d.

BP BENZIN UND PETROLEUM AG, Hamburg-Finkenwerder, West Germany. Plant manager: Direktor C. Piefke.
Crude capacity: 43,000 b/d. Vacuum distillation, thermal cracking, 7,600 b/d. Platforming, 6,000 b/sd. Hydrofining (Unde) 6,500 b/sd. Doctor and solutizer treating. Asphalt. Sulfur recovery.

DEUTSCHE ERDOEL AG, Heide-Holstein, West Germany. Plant manager: Dr. Koehler.
Crude capacity: 31,500 b/sd. Vacuum distillation, 8,520 b/sd. Thermofor catalytic cracking, 7,620 b/sd. Platforming-Unifining, 4,000 b/sd. Shell Trickle desulfurization, 8,100 b/sd. Polymerization, 380 b/sd. Solvent refining (lubes), 1,500 b/d.
Expansion in crude capacity to 50,000 b/d is planned for 1963.

DEUTSCHE ERDOEL AG, Wietz-Celle, West Germany.
Crude capacity: 800 b/d.

DEUTSCHE SHELL AG, Godorf, West Germany.
Crude capacity: 40,000 b/d. New refinery, completed in 1960, includes catalytic reformer and desulfurizer. Long-range planning indicates this refinery may eventually reach a capacity of 120,000 to 140,000 b/d.

DEUTSCHE SHELL AG, Hamburg, West Germany.
Crude capacity: 56,000 b/d (represents the combined facilities of the 18,000 b/d refinery and the new "Hohe Schaar" 38,000 b/d refinery). Catalytic creacking, 12,000 b/d. Catalytic reforming, 9,000 b/d. Desulfurization, 10,800 b/d. Polymerization, 1,200 b/d. Lube production, 3,200 b/d.

DEUTSCHE SHELL AG, Manheim, West Germany.
Crude capacity: 6,000 b/d. Lube production, 1,200 b/d.

ESSO GA, Cologne, West Germany.
Crude capacity: 68,000 b/d. Powerforming, 6,900 b/d. Hydrofining, 12,300 b/d.

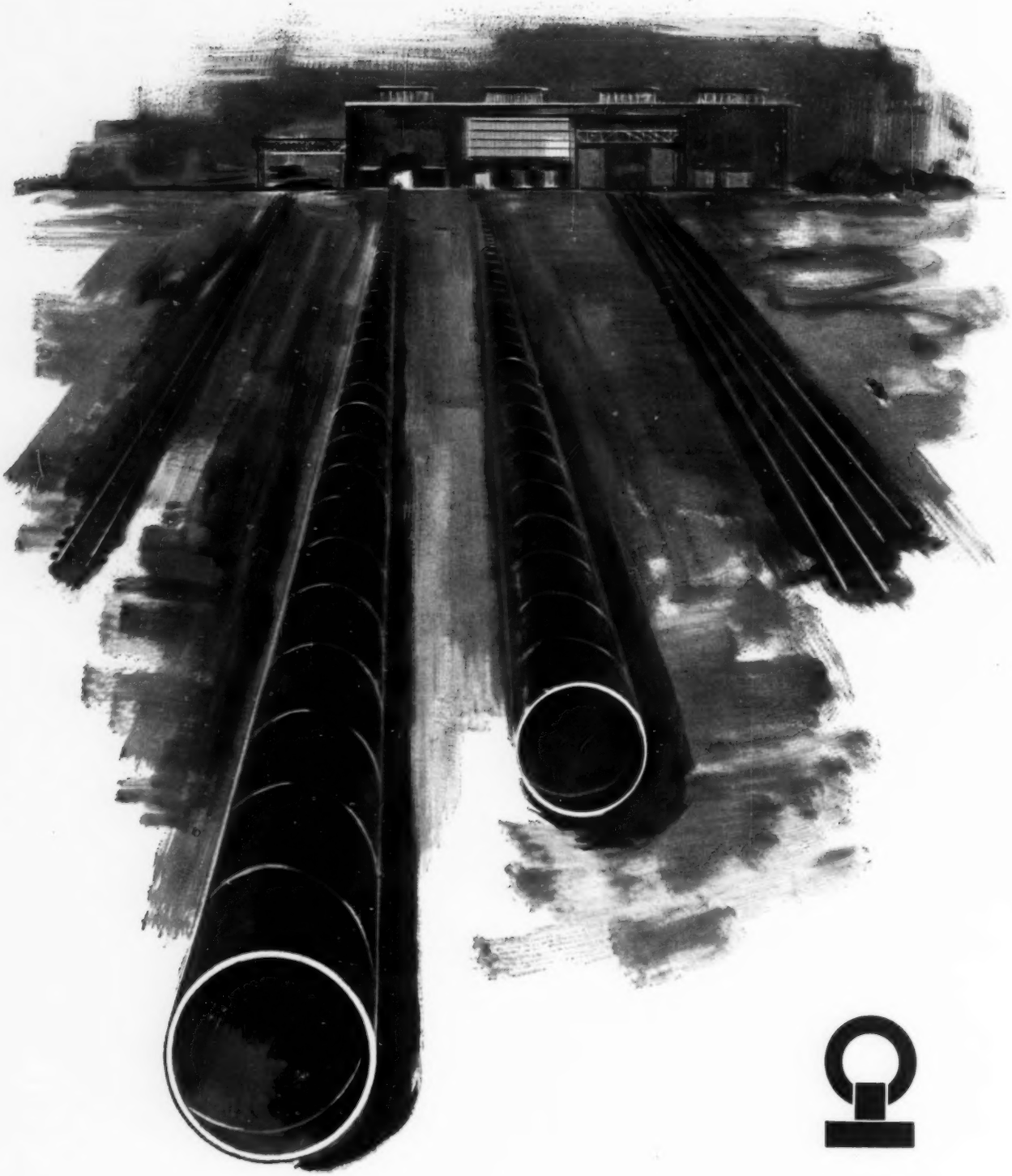
ESSO AG, Hamburg, West Germany.
Crude capacity: 50,400 b/d. Model IV fluid catalytic cracking, 10,500 b/d. Powerforming, 7,000 b/d. Hydrofining, 7,600 b/d. Lube production, 1,400 b/d.

ESSO AG, Karlsruhe, West Germany.
A new 70,000 b/d refinery is to be built at Karlsruhe, with completion expected in 1963.

FRISIA AG, Emden, West Germany.
Crude capacity: 30,000 b/d. SBK catalytic reforming, 24,000 b/d. New refinery, completed in 1960.

GELSENBERG BENZINE AG, Gelsenkirchen-Horst, West Germany. Plant manager: Dr. Wilhelm Becker.
Crude capacity: 90,000 b/d. Vacuum distillation, 11,500 b/d. Thermofor catalytic cracking, 10,000 b/d. Platforming, 18,000 b/d. Hydrogen processing, 13,300 b/d. Polymerization, 530 b/d.

GEWERKSCHAFT ERDOEL-RAFFINERIE DEURAG-NERAG, Misburg, near Hanover, West Germany. Plant manager: Dr. Hans Weller.
Crude capacity: 11,000 b/d, Vacuum distillation, 9,000 b/d. Thermal cracking, 5,700 b/d. Platformer-Unifiner, 3,000 b/d. Shell Trickle desulfurization,



SPIRAL welded PIPES

in all sizes from 24″-64″ diameter; ¼″-⅝″ wall thickness according to all Standards in question and in any desired quality.

SALZGITTER STAHLBAU GmbH GROSSROHRWERK

SALZGITTER-WATENSTEDT (Western Germany)

International Oil Intelligence
as contained in

WORLD PETROLEUM REPORT NEWSLETTER

Need your oil news fast? accurate? compressed?
Truly international in scope, to match an
international industry?

This new international oil newsletter
offers the following advantages:

1 **It compresses the oil news, saves you time, packs all the news in four pages with no extraneous material;**

2 **Coverage is primarily *international*— and more international news is contained than in any other source;**

3 **Airmailed, it arrives *anywhere in the world* within a few days of publication;**

4 **Every year an annual summary of oil events is mailed free to subscribers— The issue in which this appears is an example.**

These are only a few of the advantages of WORLD PETROLEUM REPORT'S airmailed oil newsletter. It may be received free, without any obligation, for two months on a trial basis. Just address your order or request for a trial subscription to:

Order Department
WORLD PETROLEUM REPORT
25 West 45th St., New York 36, New York

Our program for the petroleum industry comprises the following products:

DRILL PIPE in all sizes according to API Std. 5 A from $2^{3}/_{8}$" O. D. up to $6^{5}/_{8}$" O. D. with screwed-on, shrunk-on and welded-on Tool Joints

CASING in all sizes according to API Std. 5 A from $4^{1}/_{2}$" O. D. up to 20" O. D. with short and long threads and couplings

TUBING in all sizes according to API Std. 5 A from 1,05" O. D. up to $4^{1}/_{2}$" O. D. non-upset and external-upset

LINE PIPE in all sizes according to API Std. 5 L and 5 LX from $^{1}/_{8}$" Nom. Size up to 36" O. D. seamless and welded

PIPE FOR DISTILLATION PLANTS, CRACKING PLANTS ETC. in all sizes for all stresses

STEELS: all normal API grades as well as special steels for maximum stresses

SPECIALTY

CASING and TUBING with extremely high joint strength
OMEGA-JOINTS and **EXTREME LINE JOINTS**

Demand our special catalogues

Varying according to the specific requirements we supply the following products made of standard and special steels as well as of clad plates:

Containers and apparatus, such as:
coke towers · vacuum towers
fractionating columns · stabilizers · reactors
evaporators · heat exchangers · coolers
high pressure vessels
as strip-wound pressure vessels
or solid vessels
transport vessels
storage vessels for liquids and gases
spherical caps and segments, hot-pressed
for spherical containers
heads, hot-pressed · flanged and flad heads
spherically dished heads, ellipsoidal heads
shells, bent and welded
tubular coils and tubular systems
tube bends and specials
tubes for distillation, refinery and cracking plant etc.
· flanges · fittings with API-threads
wide flat steel · plates, sections and bars
made of unalloyed and low-alloy materials
plates, medium plates and sheets, sections and bars as well as electrodes
made of our SICROMAL and RHEINROHR
special steels
clad plates

PHOENIX-RHEINROHR AG
VEREINIGTE HÜTTEN- UND RÖHRENWERKE DÜSSELDORF
GERMANY

Completely New!

Sixth Edition
BRANTLY ROTARY DRILLING HANDBOOK

For the sixth time in the past quarter of a century J. E. Brantly and his staff of expert engineering editors have completely rewritten the Brantly Rotary Drilling Handbook to cover new developments in the equipment and technology of drilling.

The new edition is more than 20 percent larger than its most recent predecessor. Illustrations including practical nomographic charts and performance curves have been increased from 122 to 603 in the new edition.

Bound in sturdy black fabricoid with rounded corners for long service at the rig as well as in the office, **the new sixth edition is now ready for shipment at $12.50 per copy, postpaid.**

Order from:

PALMER PUBLICATIONS
25 West 45th St., New York 36, N. Y.

ACV

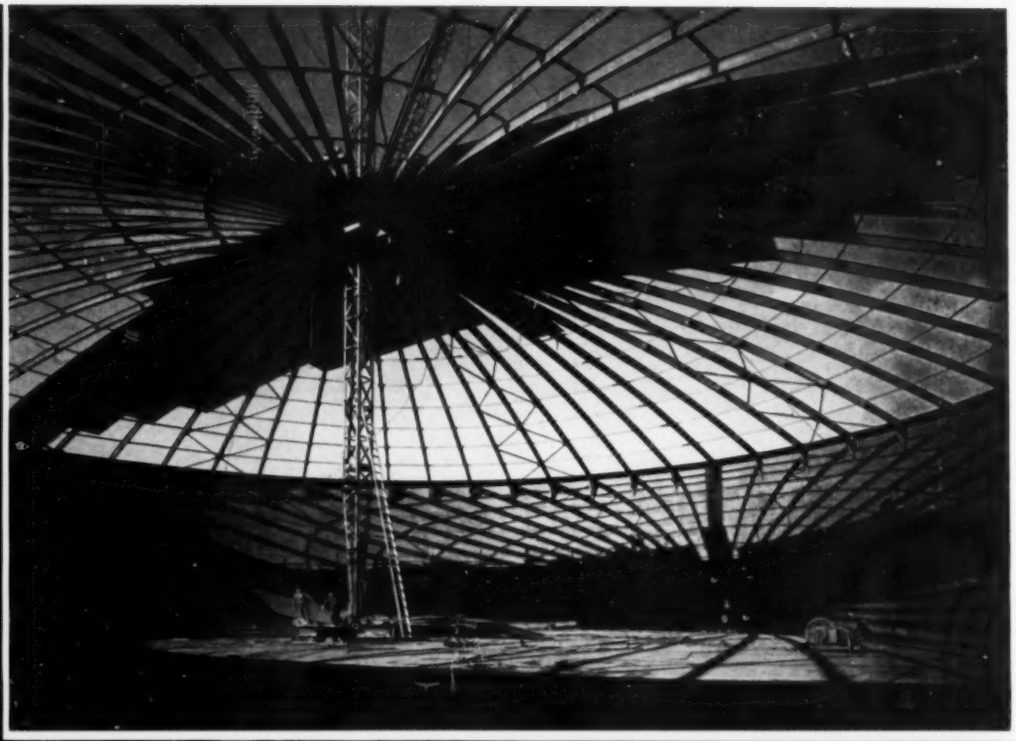
The Arbeitsgemeinschaft Chemische Verfahrenstechnik (Chemical Process Engineering Group) Dr. Stage-Schmidding-Heckmann have at their disposal a comprehensive collection of computation data relevant to distillation practice. They include steam pressures, equilibrium and solubility data, which will also help you to solve your difficult separating problems.

Special design- and 80 years' practical experience of

SCHMIDDING

backed by the resources of the Chemical Process Engineering Group, ensures that advanced scientific knowledge is put to full use in the planning and construction of **Columns and Complete Distillation Plants.**

APPARATE- UND ANLAGENBAU WILHELM SCHMIDDING · KOLN-NIEHL · TELEPHONE: 745171 · TELEX: 8 882545

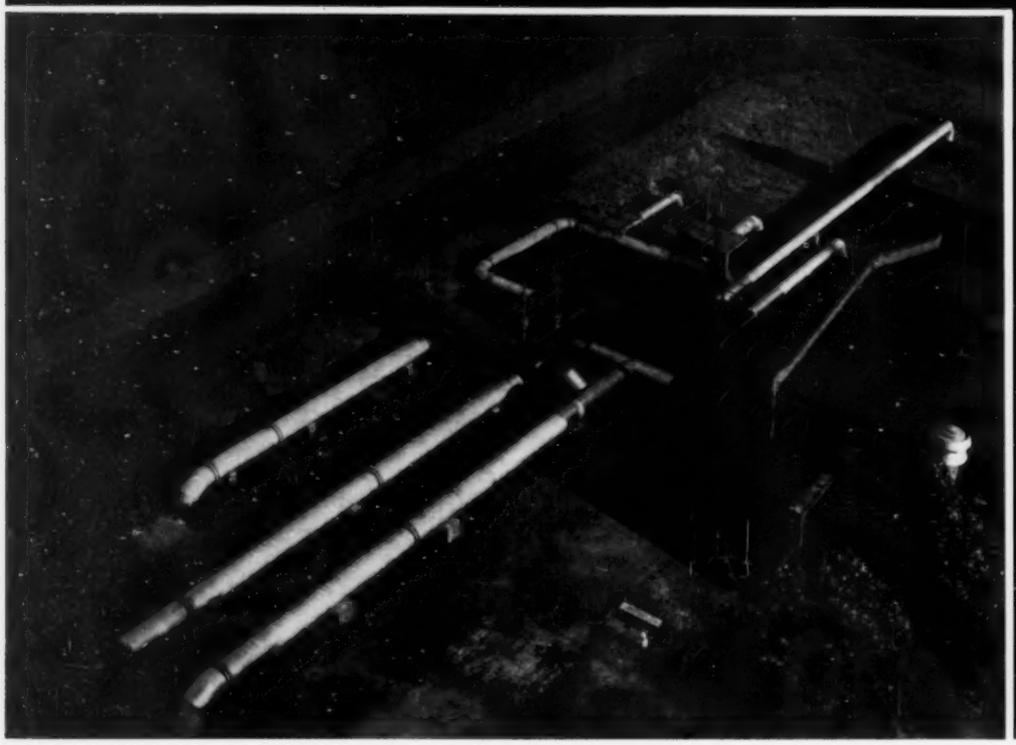


FLOATING ROOFS
IN
CONNECTION WITH

Graver Tank & Mfg. Co.
DIVISION UNION TANK CAR COMPANY
EAST CHICAGO INDIANA

FRIEDRICH KOCKS GMBH BREMEN

RICHARD-DUNKEL-STRASSE 55 · PHONE: 354051 · CABLE-ADDRESS: KOCKSING · TELEWRITER: 0244863 KOCKSING BRM



TANKS UP TO THE
LARGEST CAPACITIES

•

APPARATUSES FOR
OIL RAFFINERIES

•

PIPE LINES

LET US SAVE YOUR MONEY!

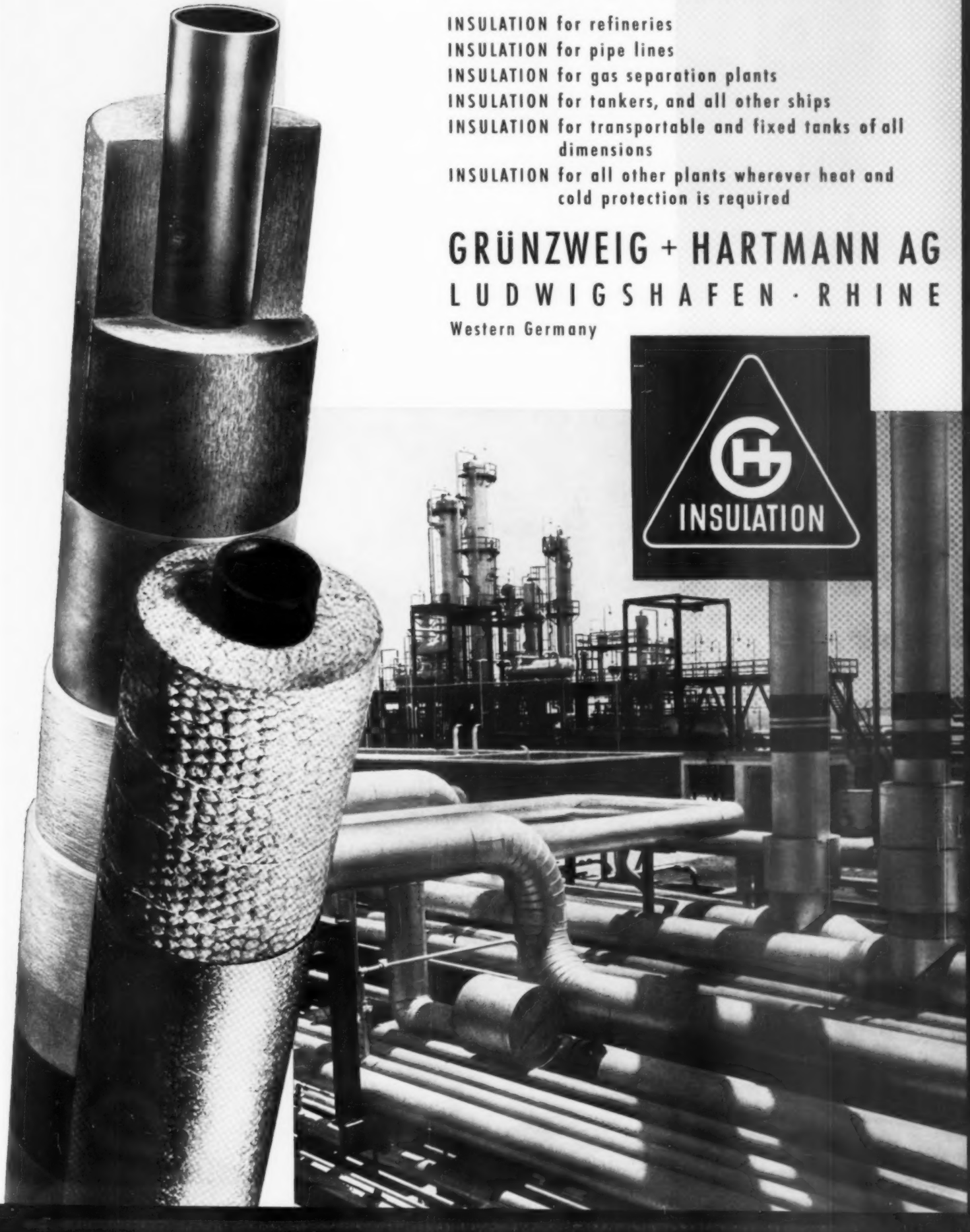
INSULATION

INSULATION for refineries
INSULATION for pipe lines
INSULATION for gas separation plants
INSULATION for tankers, and all other ships
INSULATION for transportable and fixed tanks of all dimensions
INSULATION for all other plants wherever heat and cold protection is required

GRÜNZWEIG + HARTMANN AG

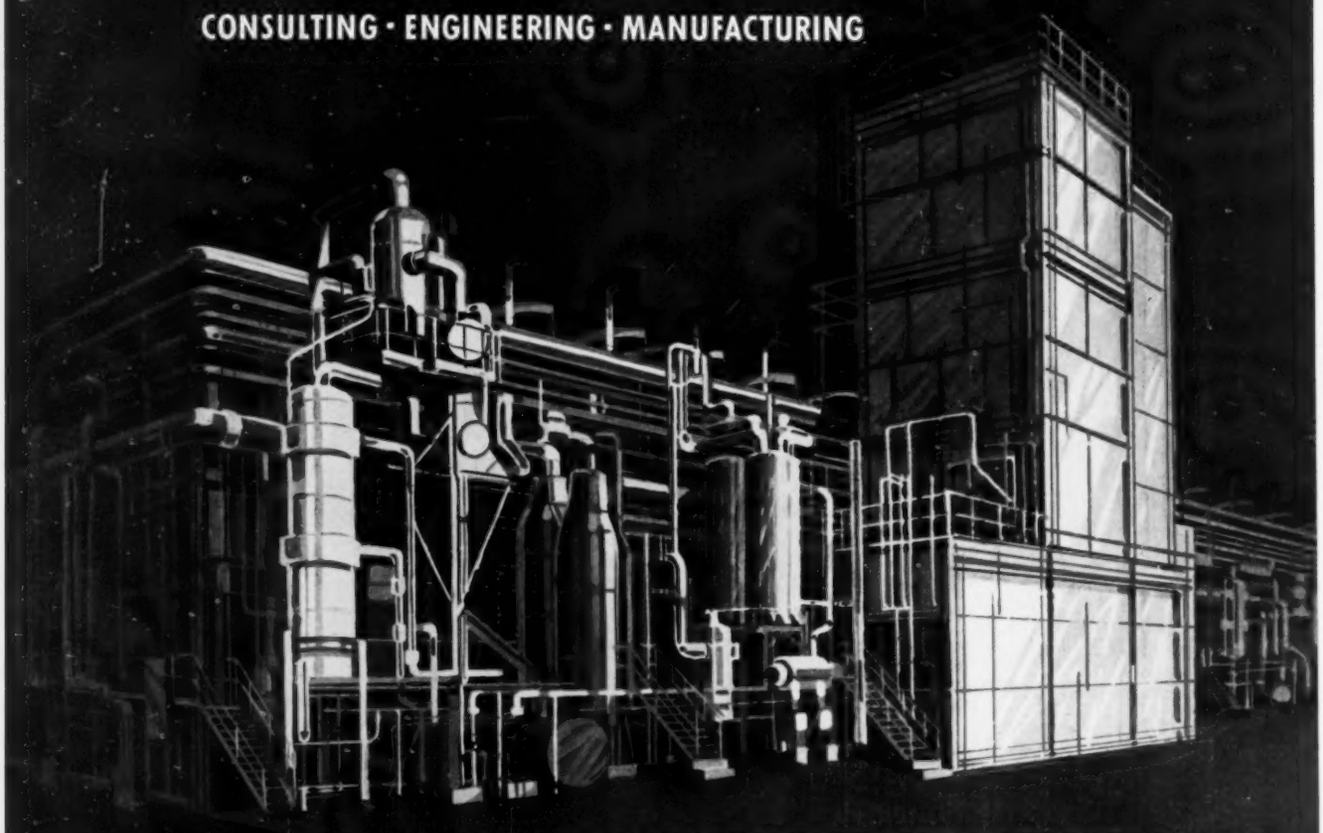
LUDWIGSHAFEN · RHINE

Western Germany



Linde

CONSULTING · ENGINEERING · MANUFACTURING

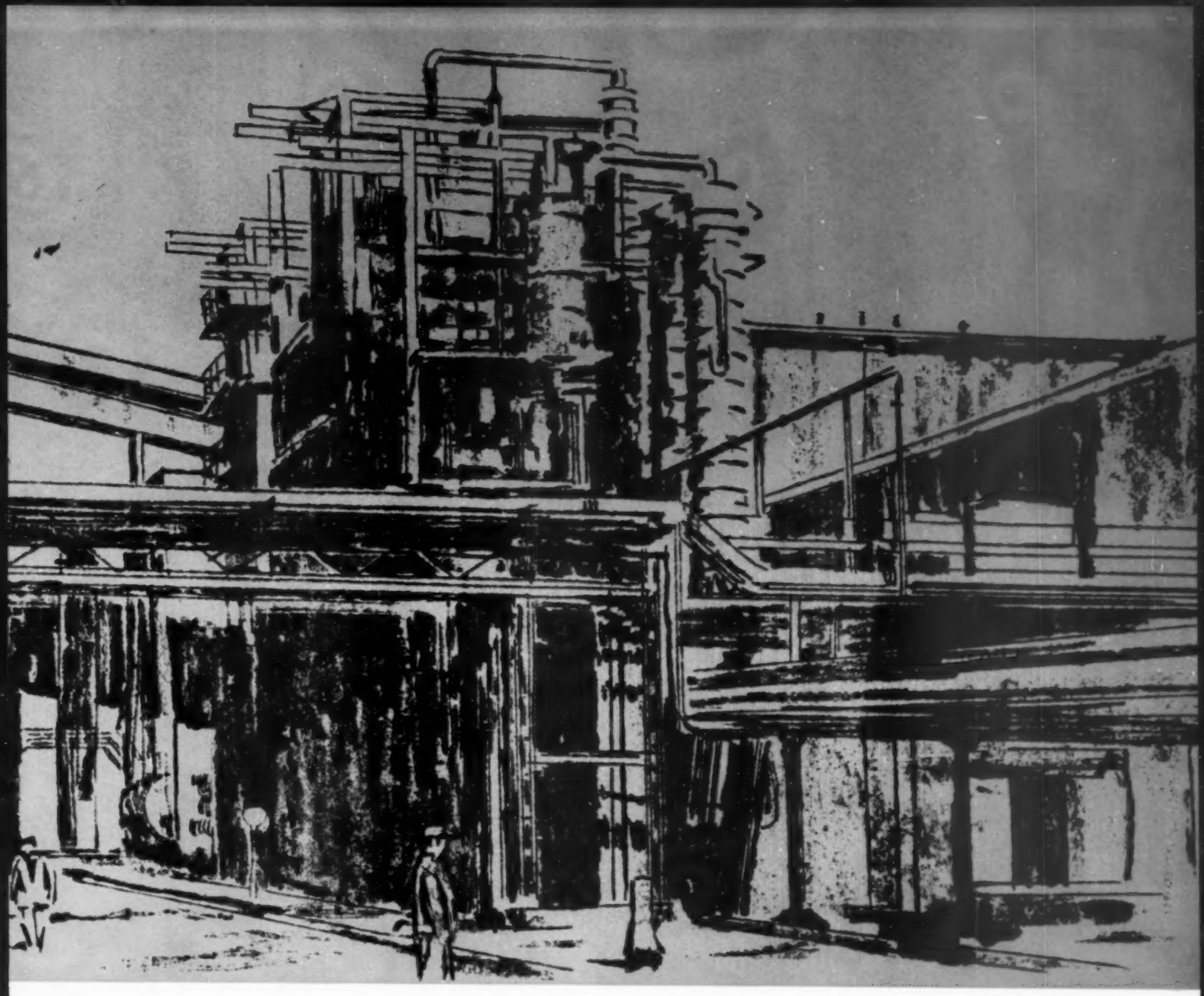


Plants for the decomposition of cracking gases or other gas-mixtures occuring in the chemical industry, in particular for the production of pure hydrogen, ammonia synthesis gas, methanol synthesis gas, purest ethylene, pure methane, pure propylene, benzene and other hydrocarbons, acetylene, pure carbon dioxyde.

Tonnage oxygen plants for the decomposition of air and in particular for the extraction of high purity oxygen and nitrogen in gaseous or liquid states, as single products or with simultaneous production of both gases, for chemical and metallurgical purposes.

GESELLSCHAFT FÜR LINDE'S EISMASCHINEN AKTIENGESELLSCHAFT

ZWEIGNIEDERLASSUNG HÖLLRIEGELSKREUTH · HÖLLRIEGELSKREUTH NEAR MUNICH, WESTERN GERMANY



Let us handle your problems

you will gain time

you will save money

with Didier	you carry out your plans quickly and satisfactorily
for Didier	helps in the development work
	... does not rely only upon its own plants but supplies you with a wide variety of materials from all parts of the world
	... places a trained staff of experienced technicians and engineers at your disposal – not only during the installation but also for subsequent maintenance
Didier means	development work, supplies of materials assembly – all done by one organisation.

DKH

Didier Industrial Plants all over the World

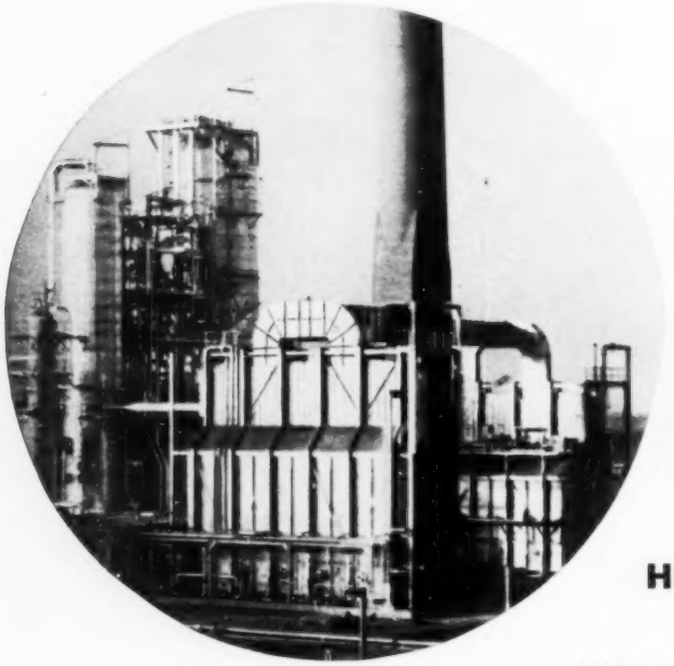
Didier-Werke AG · Didier-Kogag-Hinselmann · Essen · Western Germany

HEATERS

OF VARIOUS TYPES

FOR OIL, GAS AND PETROCHEMICAL PROCESSING

will be especially designed for your heating requirements. Updraft-, box-, cylindrical-heaters with horizontal or vertical tubes and special airheaters are at your disposal.



Many years of experience and development guarantee maximum technical standard for complete design and delivery

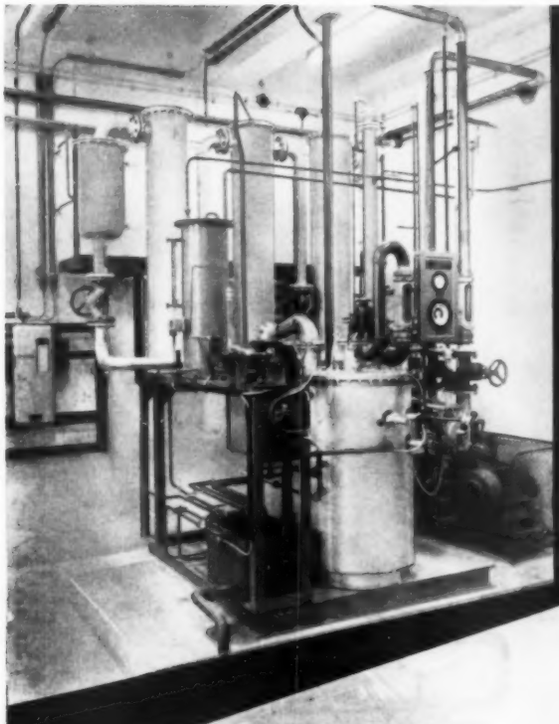
HEAT ENCLOSURE METHODS
SYSTEM »DETRICK«

AND ALL LININGS WITH:

- **INSULATING FIREBRICK**
- **CASTABLE REFRACTORY**
- **CASTABLE AND BLOCK INSULATION**
- **GUNNITE APPLICATION**

CLAUDIUS PETERS A.G.

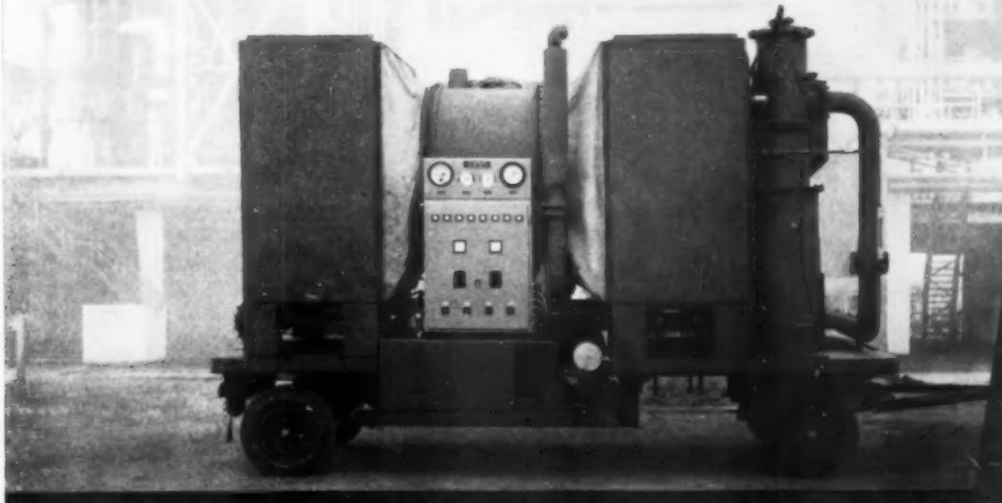
HAMBURG 1 · POST-BOX 790



Einen für alle
Zwecke geeigneten
GENERATOR
FOR CONTROLLED
ATMOSPHERES
gibt es nicht!
Aber den jeweils
Richtigen
liefert Ihnen

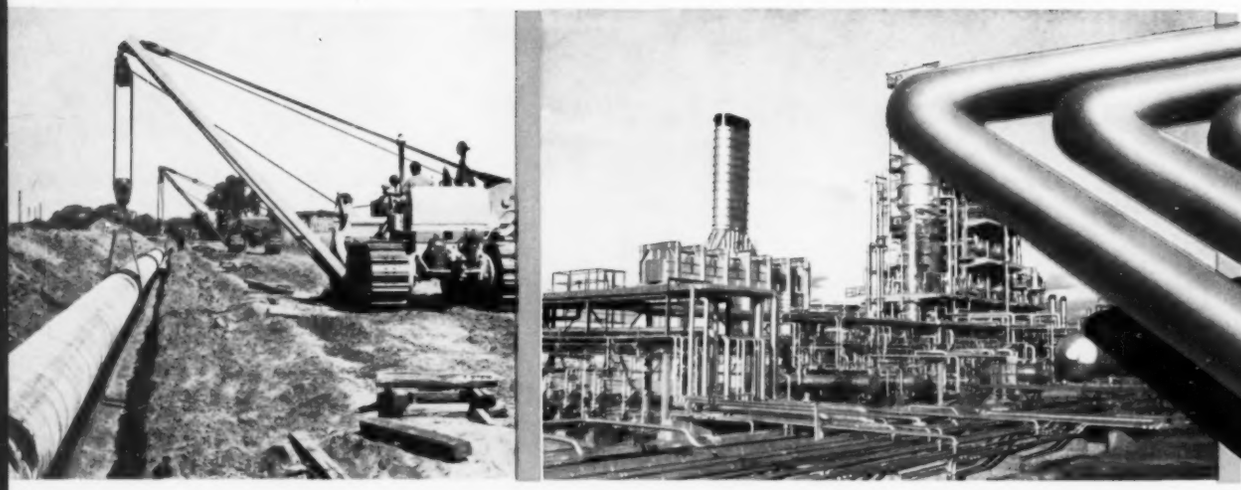
mahler

$N_2 + CO_2$	INERTGAS	INERT GAS	GAZ INERTE
N_2	STICKSTOFF	NITROGEN	NITROGÈNE
CO_2	KOHLENDIOXYD	CARBON DIOXYD	ACIDE CARBONIQUE
H_2	WASSERSTOFF	HYDROGEN	HYDROGÈNE



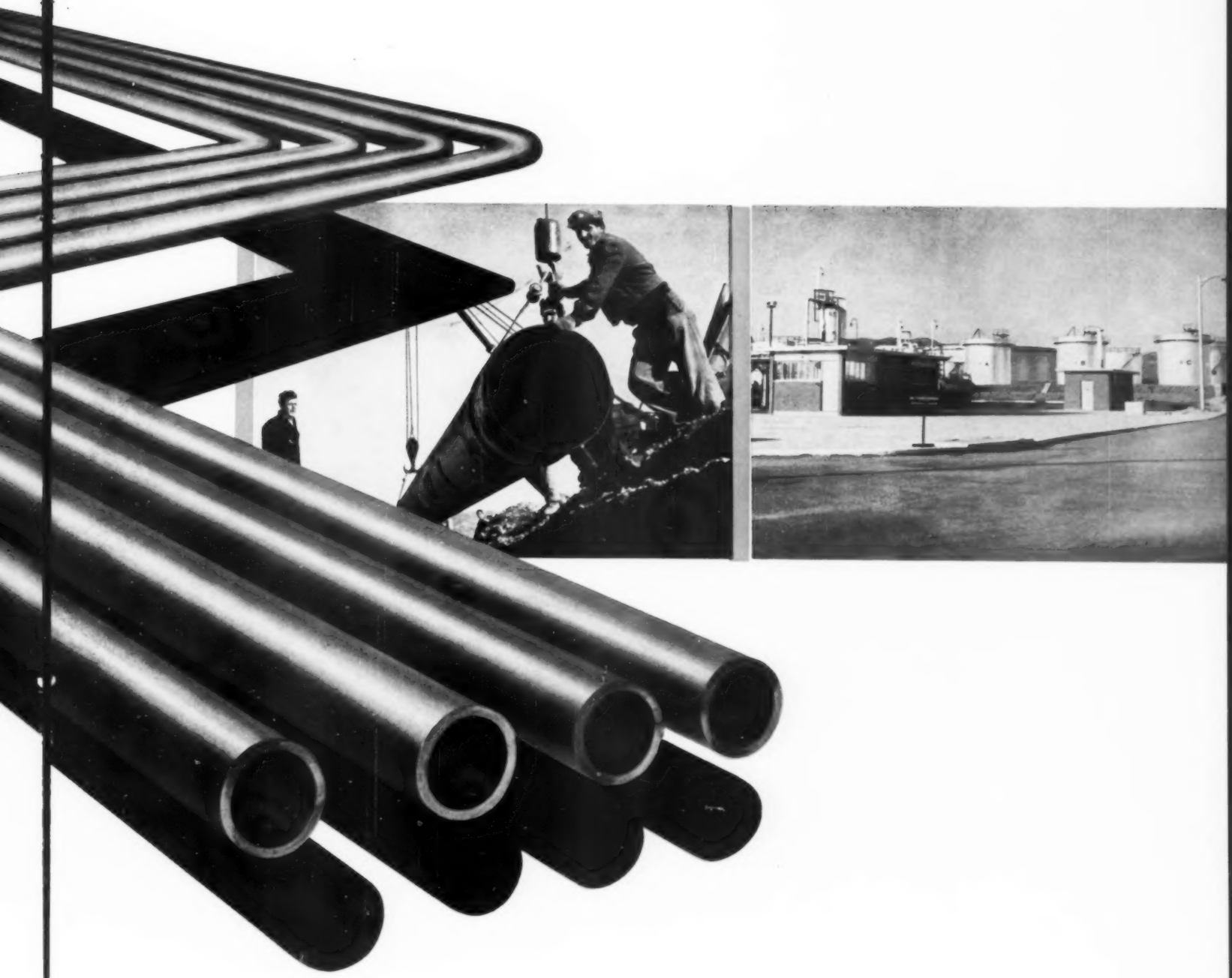
J. F. MAHLER APPARATE- UND OFENBAU K.G. ESSLINGEN/N

PHOENIX-RHEINROHR INTERNATIONAL GMBH



Supply and construction

of pipelines, refineries, chemical and industrial plants.



PHOENIX-RHEINROHR INTERNATIONAL GMBH

DUESSELDORF · GERMANY

MONITORS

for Water and foam making

stationary—portable—also hydraulic on distance

Switch-commutator from water to foam,
with device for automatic suction adsorption
of the foam-extract,

greatest distances attained, mouth-pieces until 100 mm dia,
Foam-capacity until ca. 25 cbm/min.

swingable around 360°, with a device for lifting
the jet-pipe and foam-pipe from —30° until +90°
by means of a worm-drive,

all swingable parts running on ball-bearing,
pressure lubrication by grease nipples.

Outfit: a) Light metal (aluminate processed-sea water proof-), steel, bronze
or b) of brass, steel and bronze

Application-aim: for Raffinerien, petroleum-docks, for Fire fighting trucks, fire fighting boats a.s.o.

Please contact us for further information.

ALBACH & CO. Spefialfabrik für Feuerlóschgeráte

Frankfurt/Main—Hoechst (Germany) Telefon—No. 313405 Ffm.

Monitor Type "S"

Are you selling to the oil industry?

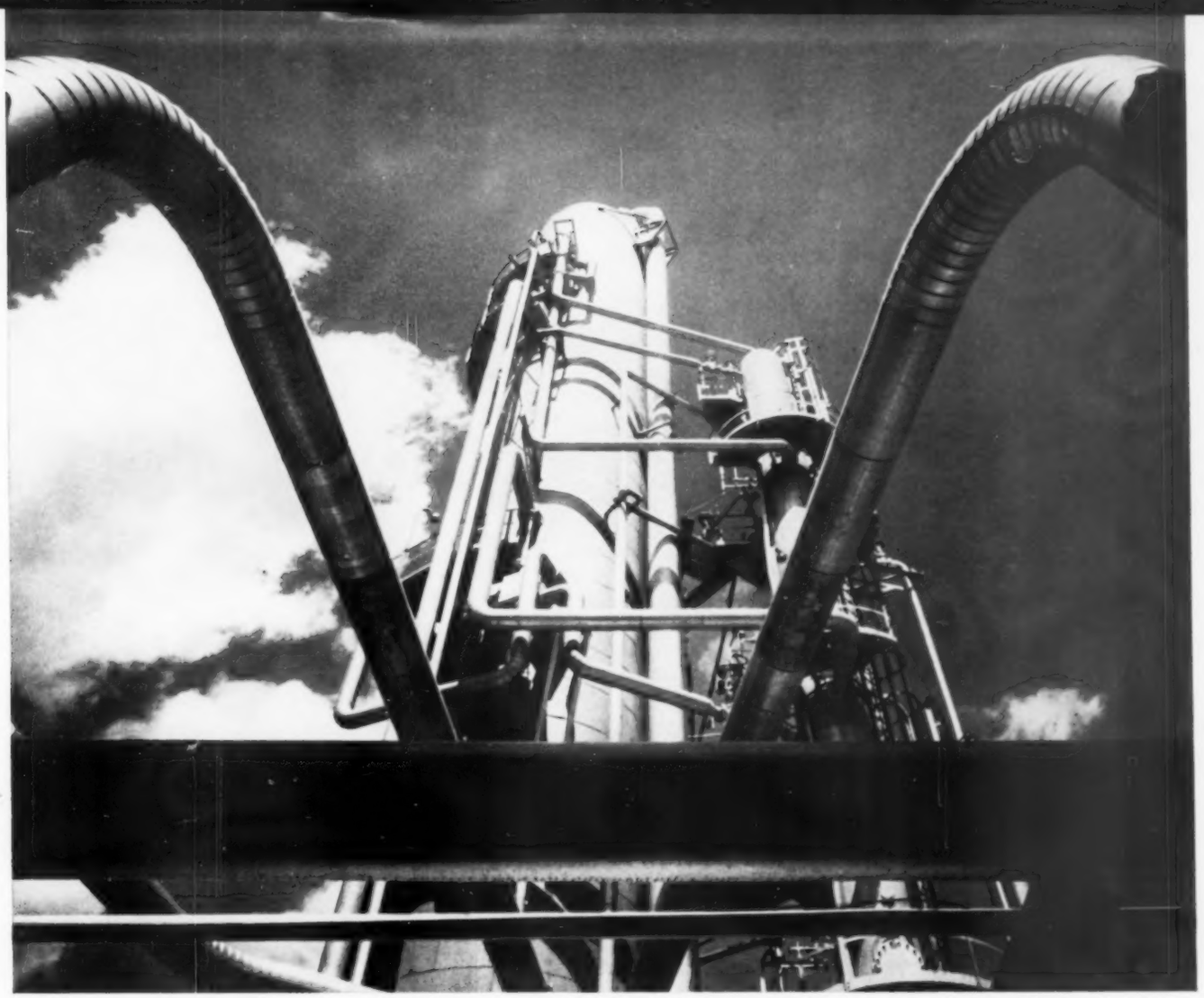
Here is the international oil industry's oldest and most complete directory:—

THE INTERNATIONAL PETROLEUM REGISTER

- It has been completely redesigned to place at your fingertips the most up-to-date information on every oil producing company, wherever in the world it operates.
- Every one of your district sales offices and your distributors should have a working copy of the 36th Edition of the International Petroleum Register. The price is only $25.00 for this 500-odd-page book of over 30,000 names.
- Send in your order today, take a look and we know you'll be more than satisfied.

INTERNATIONAL PETROLEUM REGISTER

25 West 45th Street **New York 36, N. Y., U.S.A.**



Top: Part view of one of the largest West German refineries. In the construction of this plant, FRIED. KRUPP INDUSTRIEBAU took a major share.

Bottom: Splitter column — material boiler-plate H II, diameter 2150 mm, length 38 500 mm, wall 12 mm, weight 68 tons — erected by FRIED. KRUPP MASCHINENFABRIKEN ESSEN

150 YEARS
KRUPP
1811 | 1961

KRUPP Serving the Petroleum Industry

For 150 years the name of KRUPP has been a synonym for high quality craftsmanship and engineering skill. It stands for pioneerwork in many fields of industrial research and production engineering — work which has caused the name of KRUPP to be associated with engineering progress throughout the world.

KRUPP was first in developing the special-purpose and high-grade steels used today wherever crude is fractionated, cracked or distilled.

KRUPP will be found actively engaged on many petroleum projects in Europe, in North, Central, and Latin America, and in the Middle East where refineries and petrochemical plants are to be erected, and has also delivered equipment to refineries set up in Columbia, Cuba, Egypt, Greece, Portugal, Venezuela, and Germany.

Large petroleum projects are being planned to cover the ever increasing demand for oil and many of them will be realized with substantial engineering help from KRUPP. Recently, two refineries were completed to boost the manufacture of finished oil products in West Germany, one designed to process 4.5 million tons and the other 2.5 million tons of crude annually. In both cases, KRUPPS were acting as contractors for the manufacture, supply and erection of reactors, columns, heat exchangers, tanks, structural steelwork, and for part of the civil engineering work.

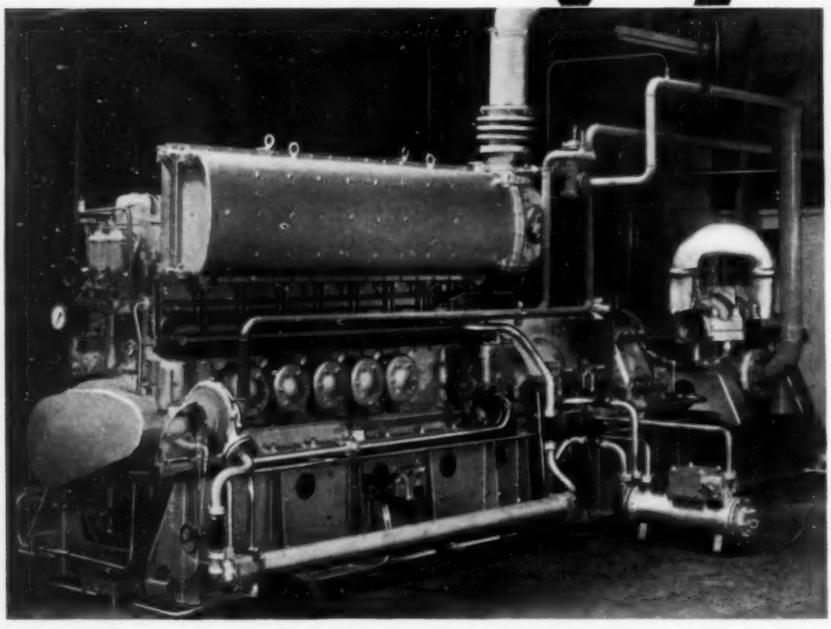
Reactors · Regenerators · Heaters · Scrubbers · Water separators · Acid separators · Heat exchangers · Coolers · Coking retorts · Autoclaves · Agitator vessels · Pressure vessels · Columns · Column trays · Speed reducers · Compressed gas receivers · Storage tanks of plain and alloy steels Tankers · Tank wagons · Mobile cranes · Rolled products · Pipes and tubes · Stationary Diesel generating sets · VERDUR alloy for hard-facing drill bits · WIDIA carbide flow nozzles for drill bits WIDIA carbide valves and jet nozzles · Complete refineries, designed and erected in cooperation with other specialist firms.

FRIED. KRUPP · ESSEN · GERMANY

Agents in many countries. In the USA represented by KRUPP International Inc. 375 Park Avenue, New York 22/N.Y.

OVER 3 THROUGH 2000 HP

ranges our production program comprising a suitable Diesel for every application. Even for Oil Boring and High Pressure Pipe Line Pumping there are highly efficient, reliable, economic units in our catalogue.



MWM DIESEL

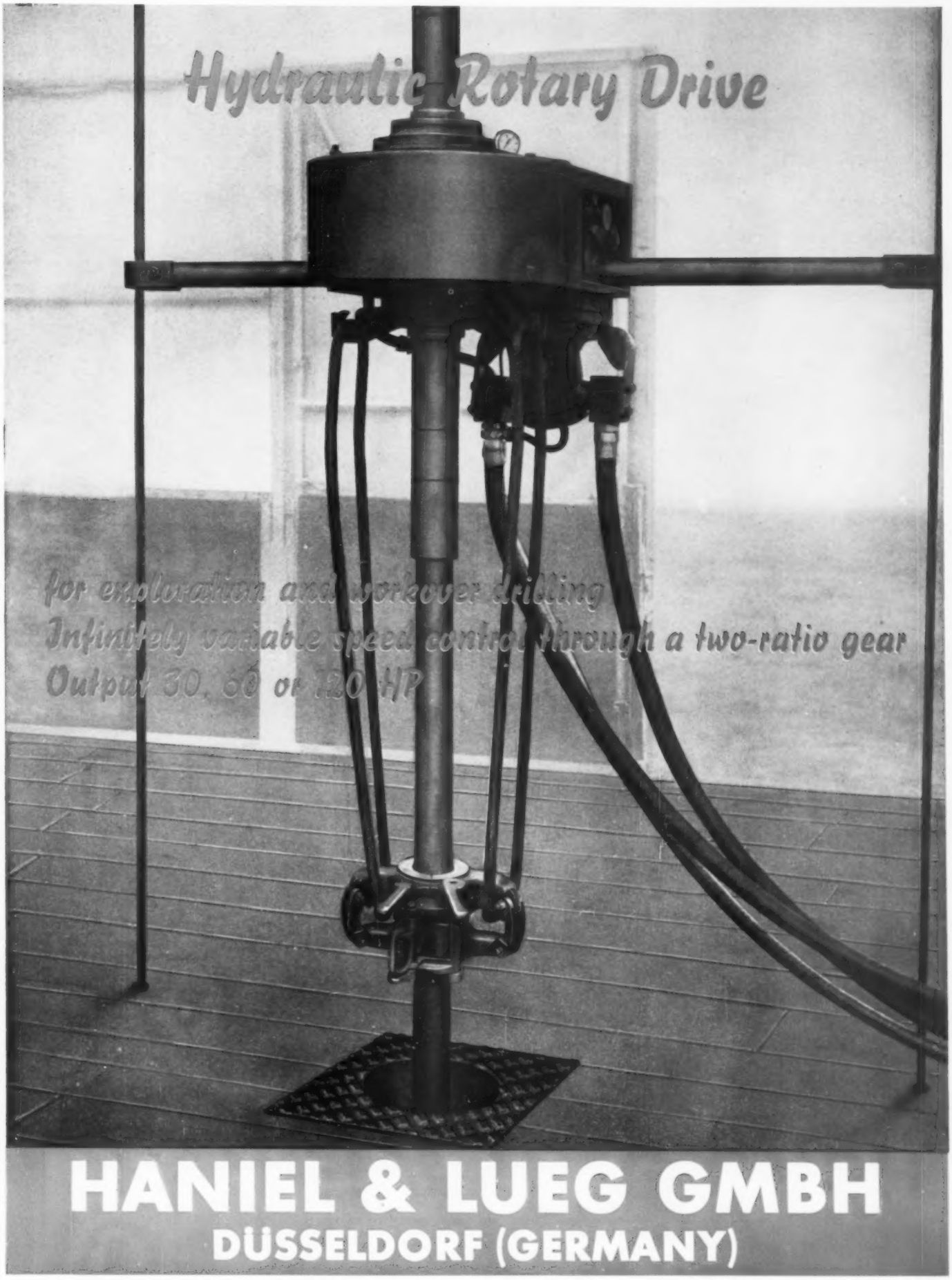
The engine deserving of your confidence

Pipe Line Pumping Set, Explosion Proof

Consisting of
Four Stroke MWM-Diesel Engine, Type TRHS 526 A, 435 HP at 900 R.P.M.
Worthington Pump, Type 6-UZD-1, Delivery: 450m³/hr at 25 atm. gauge

MOTOREN-WERKE MANNHEIM AG

MANNHEIM · GERMANY


Hydraulic Rotary Drive
for exploration and workover drilling
Infinitely variable speed control through a two-ratio gear
Output 30, 60 or 120 HP
HANIEL & LUEG GMBH
DÜSSELDORF (GERMANY)

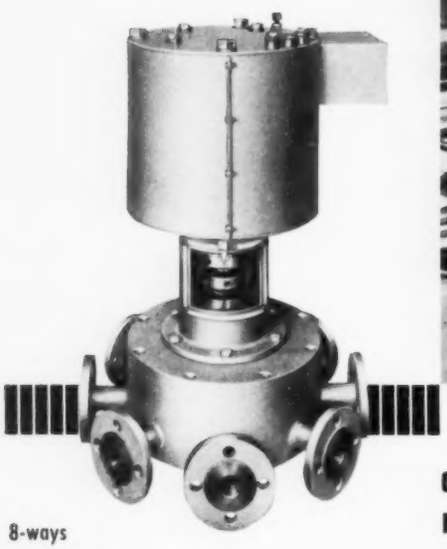
G-S-T

GESELLSCHAFT FÜR

Manufacturer of control instruments

with more than 50 years experiences

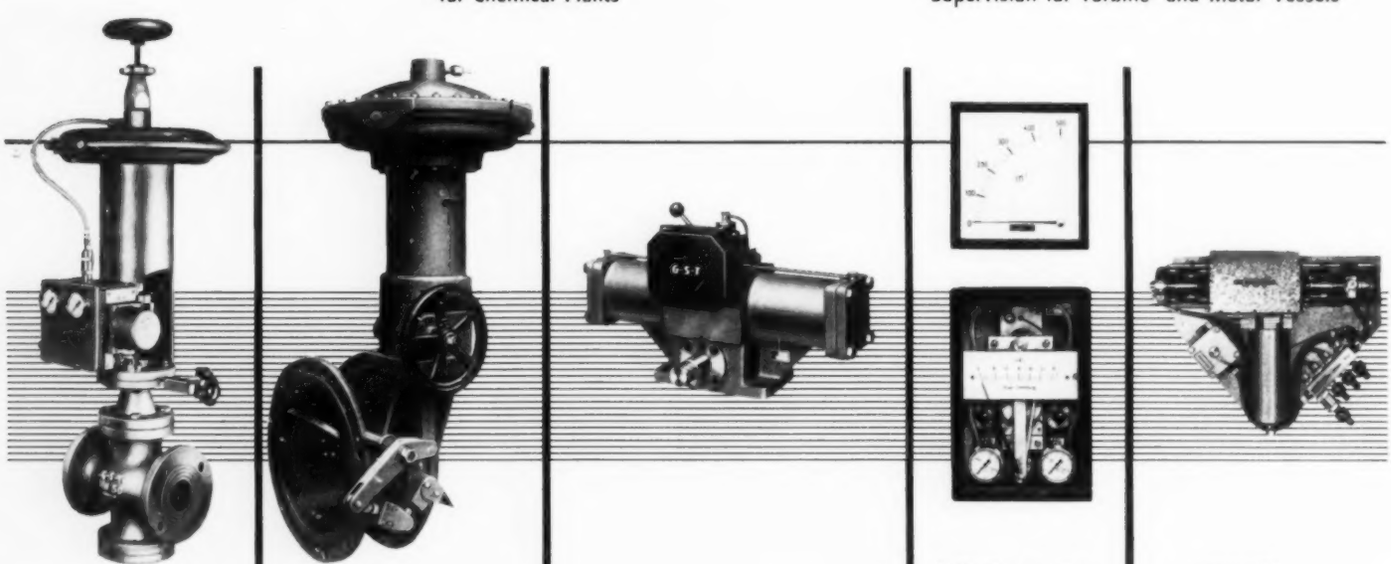
instrument panel in a vessel



8-ways
regulating valve

CONTROLLERS · TRANSMITTERS
MEASURING INSTRUMENTS
REGULATING VALVES and other
CONTROL DEVICES
for Chemical Plants

Automation of Production
Heat- and Energy Economy
COMPLETE CONTROL STATIONS
for Boiler- and Power Station Control and
Supervision for Turbine- and Motor Vessels



regulating valve
with positioner

butterfly valve
with handwheel drive

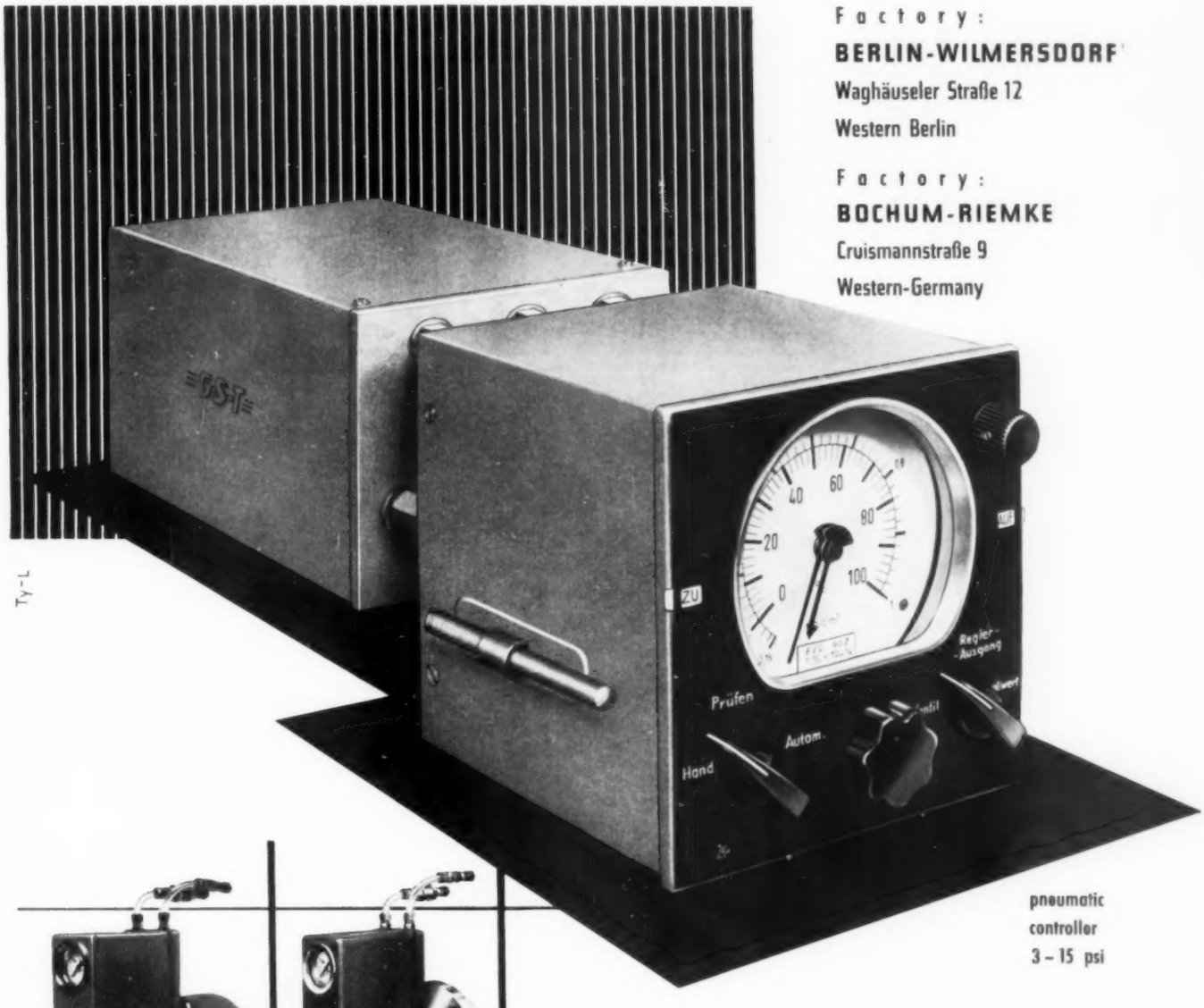
pneumatic servo motor
with positioner

indicating counter

pneumatic controller

pneumatic
analog
computing relay

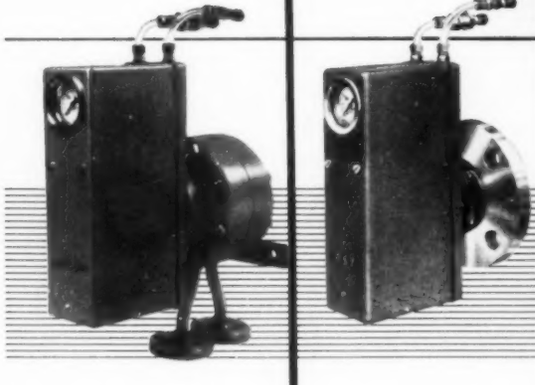
SELBSTTÄTIGE TEMPERATURREGELUNG



Factory:
BERLIN-WILMERSDORF
Waghäuseler Straße 12
Western Berlin

Factory:
BOCHUM-RIEMKE
Cruismannstraße 9
Western-Germany

pneumatic
controller
3 – 15 psi



transmitter
for differential
pressure

direct mounting
pressure transmitter
with flange

electronic
instrumentation
and control systems

G·S·T

3,750 b/d. Polymerization, 1,450 b/d. Texaco dewaxing, 1,400 b/d. Edeleanu dewaxing, 1,600 b/d. Furfural refining, 1,850 b/d. Deasphalting, 1,400 b/d.

GEWERKSCHAFT ERDOEL-RAFFINERIE EMSLAND, Lingen-Emsland, West Germany, President: Dr. Josef Rust.
Crude capacity: 55,000 b/d. Catalytic cracking, 8,900 b/d. Catalytic reforming 3,000 b/d. Polymerization, 800 b/d. Hydrosulfurization.

GEWERKSCHAFT GRIEFE BERGBAU MINERALOEL RAFFINERIE, Dollbergen, West Germany.
Crude capacity: 500 b/d.

KRAFTSTOFF HANDELS GmbH, Essen, West Germany .
Crude capacity: 8,000 b/d.

MINERALOEL UND ASPHALTWERKE AG, Ostermoor-Holstein, West Germany. Manager: Dr. Richard Ladwig.
Crude capacity: 5,000 b/d.

MINERALOELWERKE PEINE, Peine, West Germany.
Crude capacity: 400 b/d.

MOBIL OIL AG, Bremen, West Germany. Plant manager: H. D. Ruschmann.
Crude capacity: 28,600 b/d. Catalytic cracking, 8,000 b/d. Catalytic reforming, 4,100 b/d. Catalytic desulfurization, 5,500 b/d. Lubes, 2,600 b/d.

OELWERKE JULIUS SCHINDLER GmbH, Hamburg-Wilhelmsburg, West Germany. Plant manager: Dr. Otto Stuermann.
Crude capacity: 4,200 b/d. Vacuum distillation, 1,100 b/d. Sodium-type desulfurization, 450 b/d. Furfural-solvent extraction, 1,500 b/d. Sulfuric-acid treating, 1,500 b/d. Solvent extraction, 1,900 b/d.
Under construction: 2,350-ton-per-day $4.76 million dewaxing unit, to be completed in 1961.

OELWERKE JULIUS SCHINDLER GmbH, Peine-Hannover, West Germany.
A lube plant of 700 b/d (no crude stills).

PURFINA MINERALOELRAFFINERIE AG, Duisburg-Neuenkamp, West Germany. General manager: Dr.-Ing. Herbert J. Kimmerle.
Crude capacity: 20,000 b/d. Platforming and Unifining, 3,600 b/d. HDS-Trickle desulfurization, 3,300 b/d. Copper-chloride treating.
Expansion in crude capacity to 60,000 b/d is planned for 1961.

RUHRBAU MINERALOELRAFFINERIE GmbH, Mülheim (Ruhr)-Speldorf, West Germany. General Manager: Dr.-Ing. Herbert J. Kimmerle.
Crude capacity: 6,000 b/d. Vacuum distillation. Principal product, asphalts.

RUHRCHEMIE AG, Oberhausen-Holten, West Germany. Plant manager: Mr. Knoellinger.
Crude capacity: 9,000 b/d. Thermofor catalytic cracking, 3,000 b/d. Platforming, 2,000 b/d. Unifining, 3,800 b/d.

SCHOLVEN CHEMIE AG, Gelsenkirchen-Buer, West Germany.
Crude capacity: 40,000 b/d. Catalytic cracking, 4,700 b/d. Catalytic reforming, 9,900 b/d. Hydrogen processing, 8,800 b/d. Polymerization, 200 b/d.

UNION RHEINISCHE BRAUNKOHLEN KRAFTSTOFF AG, Wesseling-Cologne, West Germany. Managing directors: Dr. K. Wissel and Dr. W. Wiebourg.
Crude capacity: 65,000 b/sd. Vacuum distillation. Thermal cracking, 12,000 b/sd. Thermal reforming, 6,000 b/sd. Platforming, 6,750 b/sd. Crude-oil hydrogenation, 9,500 b/sd. Polymerization, 500 b/sd.

WINTERSHALL AG, Salzbergen, West Germany. President: Dr. Josef Rust.
Crude capacity: 2,100 b/d. Principal products: lube oils, paraffin, asphalt.

OIL LAWS

There was no substantial change in the oil laws of Germany, as covered in World Petroleum Report—1960, pages 234 to 256. Collection of the documents and legislation listed therein has been underway and English translation made of all. Copies of these translations have been published and are available. For copies of the publication in which they recently appeared, entitled "*Europe—Basic Oil Laws and Concession Contracts*," inquiries should be addressed directly to the publisher, *Petroleum Legislation Ltd., Post Office Box 1591, Grand Central Station, New York 17, New York, U.S.A.* This established company has published a number of similar volumes on the other major continental areas of the world as well. It supplies statistics in the international oil industry, as well as translations of all major oil laws and concessions.

NATIONAL FACTORS

The German economy continued its strong upward trend. Given the tradition of private enterprise, the principal determinates of investment favorability is the level of taxation. A detailed study of taxation in Europe, with a separate section for Germany, was completed in late 1960 and is to be published in 1961. The French section of the study, written by a representative of ESSO Standard, may be seen in the French section of this report. The entire taxation series is contained in *International Taxation Series*. It is published by Petroleum Legislation Ltd., a Bahamian corporation whose sales are handled through a New York sales office. For information inquiries should be addressed to *Petroleum Legislation Ltd., Post Office Box 1591, Grand Central Station, New York 17, New York, USA*. The taxation of companies varies according to their legal character.

When forming stock companies, a company foundation tax of 3% of the capital has to be paid. No such tax is payable when forming personal partnerships.

Stock companies are subject to a corporate income tax amounting to 45% of the company's net profit. Furthermore, the amount distributed as dividends to shareholders is subject to income tax payable by shareholders on a graduated scale. Insofar, therefore, as profit distributions of stock companies are affected, there arises with regard to the distributed profits a double taxation, since profits are first of all subject to corporate income tax, and furthermore to the income tax collected from the shareholders. Under certain conditions, however, the corporate income-tax rate is reduced to 30% with regard to a certain amount of dividends paid to the shareholders.

The personal partnership, as such, is not subject to any corporate income tax. The partners have to pay income tax on their share in the partnership's profit.

There exists in Germany a property tax amounting to 1% of the value of property. In the case of stock companies, the property tax is assessed on their capital. The shareholders have to pay property tax as well on the value of their share. In the case of personal partnerships, there is no property tax payable on the partnership's capital. END

E-T-A

MINIATURE OVERCURRENT SWITCHING AND PROTECTIVE DEVICES FOR ELECTRICAL CONTROL INSTALLATION

CIRCUIT BREAKERS AND PROTECTIVE RELAYS WITH A TRIP-FREE THERMAL OR THERMAL-MAGNETIC MECHANISM, WITH ADDITIONAL SIGNAL CONTACTS AND HIGH RUPTURING CAPACITY

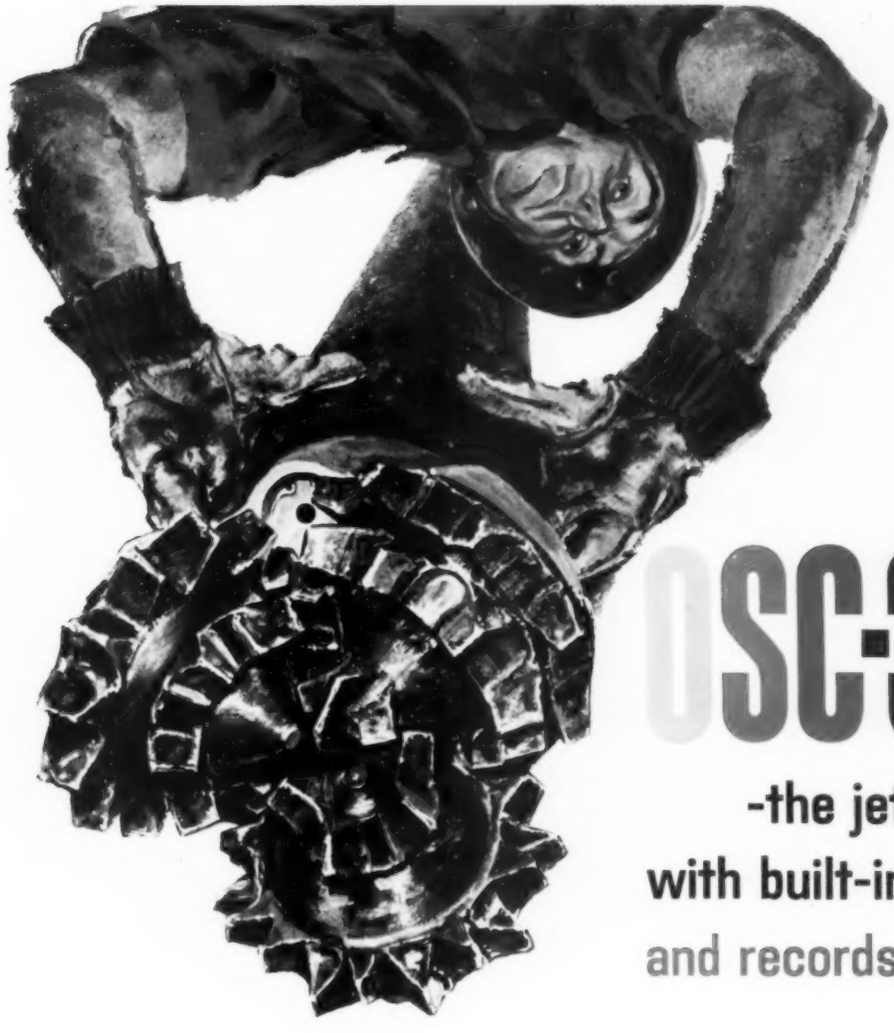
ELLENBERGER & POENSGEN

ALTDORF/NUERNBERG, GERMANY

E-T-A PRODUCTS CO. OF AMERIKA
6284 NORTH CICERO AVE.
CHICAGO, ILL., USA

E-T-A PRODUCTS OF CANADA LTD.
265 CRAIG STREET, WEST
MONTREAL, QUEBEC, CANADA

REPRESENTATIVES ALL OVER THE WORLD



OSC-3AJ

-the jet bit with built-in speed... and records prove it!

The Hughes OSC-3AJ is fast . . . it's rugged, and it's versatile. Some of the records set with the OSC-3AJ are spectacular. As an example, a Gulf Coast well was recently drilled to 10,000 feet in 3 days and 7 hours: actual rotating time — 46 hours. Only five bits were used; one 12¼" and four 9⅞".

The previous record for a 10,000-foot well in this area was made with Hughes OSC-3J's. We don't pretend that the penetration rate or footage drilled in the record well is par for the OSC-3AJ. But one thing this record does prove is the outstanding performance built into the bit.

The Hughes OSC-3AJ was originally designed for "top hole" digging. But its exceptional performance in low-strength, high-drillability formations and its availability in a wider range of sizes is extending its use to greater depths and in an increasing number of areas of the world.

Ask the Hughes man in your area about the performance you can expect with the OSC-3AJ

HUGHES TOOL COMPANY ORIGINATOR

AND WORLD'S LEADING DEVELOPER OF CONE-TYPE ROCK BITS

HOW MUCH WEIGHT?

Weight recommendations are constantly changing, as bits and drilling techniques are improved. Ten years ago we were recommending weights of 3,000 to 5,000 pounds per inch of bit diameter on a W7R. The suggested weights, today, on our greatly improved W7R, range from 4,000 to 7,000 pounds.

Looking to the future and future weight recommendations, we are experimenting with extreme weights. In a series of research laboratory tests, drilling with a 7⅞-inch W7R in granite, we applied weights up to 112,000 pounds — equivalent to 14,000 pounds per inch of bit diameter.

Frankly, we thought the teeth would snap off. But that didn't happen. Instead, drilling rate and footage increased materially, compared with the performance of the bit with a weight of 70,000 pounds.

This, of course, is controlled laboratory drilling . . . not recommended in actual practice. But the results point to interesting possibilities, in view of our new advanced research program which anticipates increased drilling weights in the future.

HUGHES

GREECE

EXPLORATION: Since late 1959, exploration in Greece has accelerated. Partly this is due to the new oil law, which is satisfactory to the companies that have entered the country, and partly it is due to the attractive prospect of production within Greece that can be sold on the growing domestic market there.

For a review of previous exploration in the country, see the Greek sections of previous issues of WORLD PETROLEUM REPORT, particularly the 1958 edition which reviews previous exploration results of the German firm, C. Deilmann Bergbau which drilled in joint venture with a Greek company. All the exploratory wells drilled at that time were dry.

The first recent concession was between the Greek government and Esso Hellenic Inc., a U.S. corporation, wholly-owned by Standard Oil Co. (New Jersey) who signed an agreement granting the corporation exploration and development rights in certain areas of Greece. The agreement, now ratified by the Greek parliament, was negotiated by Walter Gillis, SONJ representative. Operations will be conducted on an area of approximately 4,000 square kilometers located in the general area of the islands of Paxi and Zakynthos off the southwestern coast of Greece, and in the areas of Killini and Pylos in western Peloponnesia (see map). The corporation will spend a minimum of $6.4 million if operations are continued over the first eight years. If at the end of eight years no discovery has been made, the entire area will be surrendered to the Greek State. The duration of the development concessions, to be selected by the corporation in case of discovery, will be thirty years with the possibility of a ten-year renewal. This agreement represents a 50-50 venture in which the Greek state will receive 50% of the net profits of the corporation, including a royalty of 12½%.

The Greek firm, Helios, is ready to renew the search, this time with a new partner, the French government's Regie Autonome des Petroles (RAP). Helios previously drilled three dry holes in western Thrace under a joint venture agreement with the German firm Deilmann. The company spent $2-million on the previous search. Under the contract for renewal of the concession, Helios and RAP are committed to drill one deep test by April of next year and not less than three tests by 1964. Both firms are committed to spend not less than $500,000 per year until 1964. RAP has already pledged $950,000 to the venture.

The Greek government itself is also undertaking exploration. It has hired the Institute Francaise des Petroles and the Rumanian Industrial Export organization to explore two adjacent areas of northwestern Greece extending from the Albanian border to Karditsa in the Thessaly plain. The government created "Hellenic Oil Co.," a state-owned entity to supervise exploration by the French and Romanian technicians.

Hunt International was granted an exploration permit during 1960 on 1,544 sq. mi. in the Salonica-Katerini area.

British Petroleum, in partnership with the National Bank of Greece signed an agreement in 1960 for oil prospecting and exploitation rights over a land area of 5,715 square kilometers (about 2,000 square miles) in the province of Aetolia-Akarania and the islands of Lefkas and Cephalonia in western Greece. Aetolian Oil Co., S. A. will hold the concession, and operations will be conducted by BP Exploration Co. (Greece) Ltd. Under the agreement the exploration rights last for eight years, by the end of which time a development concession must be taken out. This concession would be for 30 years with a possible renewal for a further 10 years. At last report it had yet to be ratified by the Parliament.

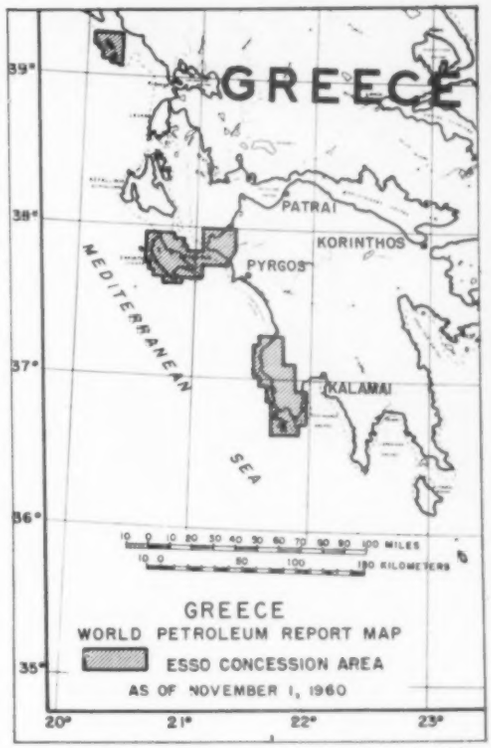
REFINING: There is only one refinery, the 27,000 b/d skimming plant near Athens. It is owned by a group which includes some Greek financing, the Niarchos Group, and others (see WPR 1959, page 84) including Socony Mobil Oil Co., which also supplies part of the crude for the plant. The Greek government has the right to supply 30% of the crude capacity of the Hellenic Petroleum Refining Co., refinery which in 1959 processed 250,000 metric tons of crude oil bought from the Soviet Union by the government in May 1959, and processed in 1960 some of the 450,000 tons bought from the USSR late in 1959. Mobil Oil Co., which has an interest in the plant, reports that processing of non-Soviet crude in the first half of 1960 came to 609,197 tons, compared with 732,827 in the first half of 1959. Imports of non-Soviet crude were 632,820 tons in the first half of 1960 against 718,106 tons in 1959.

Contract for Greece's largest single sulfuric-acid plant (376 metric tons per day capacity) has been awarded Chemical Construction (G.B.) Ltd. of England. To be erected at Ptolemais for the Greek Ministries of Industry & Coordination, it will be part of a large nitrogenous fertilizer plant.

OIL LAWS

During 1950 the Greek government passed a new oil law. The terms of the law, which was compiled with the aid of French advisors, are based on the equal division of profits and, judging from the companies who have applied for exploration rights, the law is workable.

An English translation of the law has been published in *Europe—Basic Oil Laws and Concession Contracts*. This is a service which publishes the original texts of oil laws throughout the world. They are maintained current by bound supplements to the original volumes. For information on this series the publisher should be contacted at the following address: *Petroleum Legislation Ltd., Post Office Box 1591, Grand Central Station, New York 17, New York.*



NATIONAL FACTORS

The Greek government has undertaken a new five-year plan, for the 1960-1964 period. It is designed to raise national income (net) by 6% yearly, with an improvement in living standards and in employment.

With a view to stimulating private investment and creating new industrial facilities in the country, the government has attempted to create a favorable climate for new investment in the 1960-1964 period through the use of tax incentives. These include duty-free importation of equipment and substantial tax exemptions on reinvested profits.

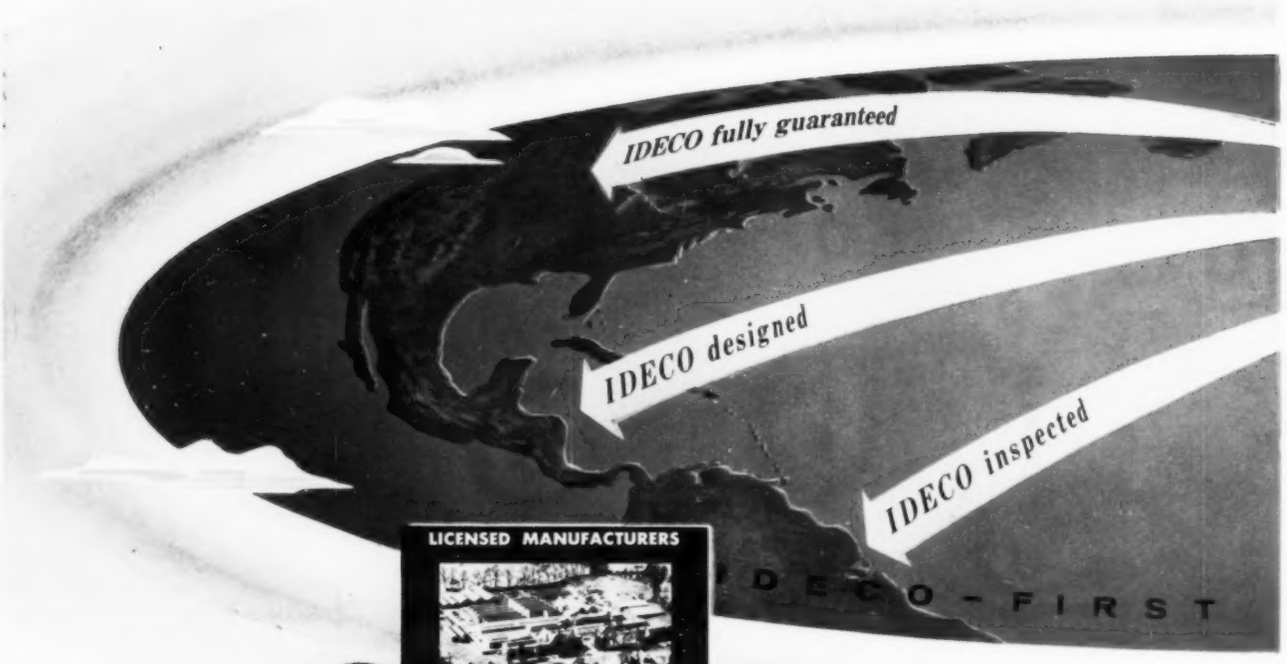
Tax incentives for new investments are available under Legislative Decree 4002 (published in Government Gazette Vol. 1, 31 October 1959). END

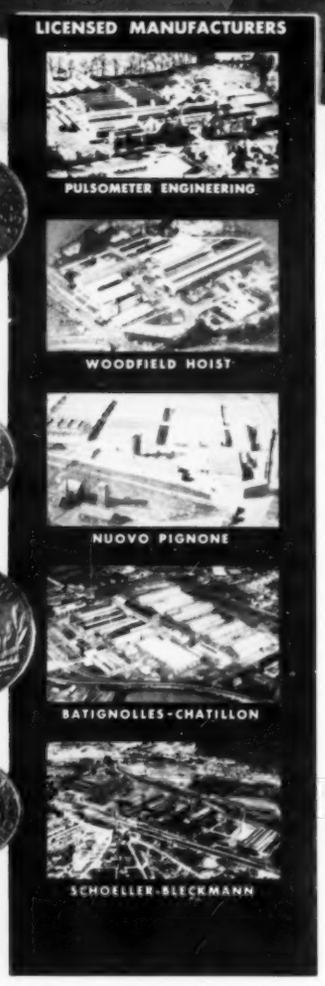
GREECE—Imports,[1] 1959
(Thousand barrels)

	Gasoline Avia.	Gasoline Motor	Kerosine	Diesel oil	Fuel oil	Lubricants	Asphalt	Total
United States	35	1	—	45	45	77	—	203
Neth. Antilles	34	—	—	—	—	—	—	34
Belgium	—	—	—	—	—	6	—	6
Bulgaria	—	—	—	—	44	—	—	44
France	—	19	3	74	34	—	—	130
Italy	32	56	12	149	559	5	18	831
Netherlands	7	—	—	—	—	33	4	39
Rumania	—	23	77	104	213	2	5	424
United Kingdom	38	6	1	27	2	21	—	95
U.S.S.R.	—	37	32	296	348	—	—	713
Aden	17	18	4	36	16	—	—	91
Bahrein	—	—	—	32	43	—	—	75
Iran	—	1	—	—	1	—	—	2
Kuwait	—	—	—	1	—	—	—	1
Saudi Arabia	—	—	—	31	71	—	—	102
Other	—	—	—	—	—	3	1	4
Total	158	161	129	795	1,376	147	28	2,794

[1] Crude petroleum imports amounted to 10,079,000 barrels in 1959.
Source: American Embassy, Athens, through the United States Department of State.

Complete IDECO® Rigs





England

Italy

France

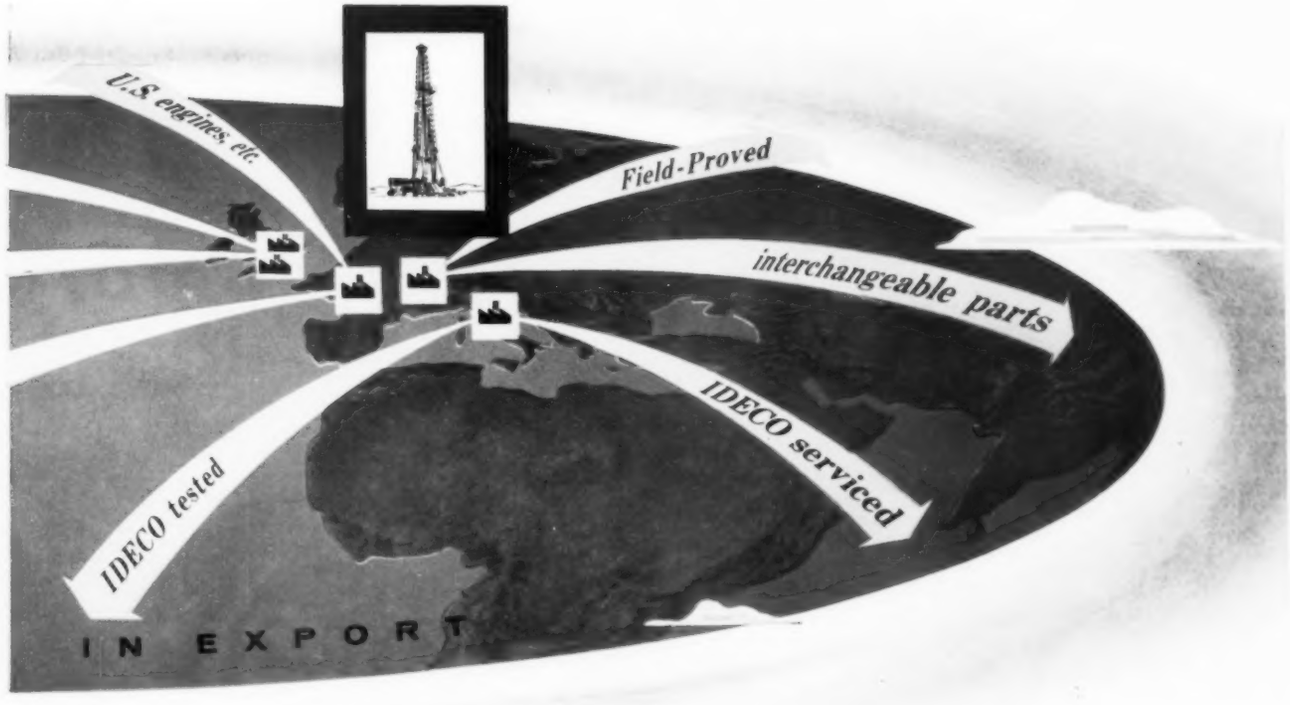
Austria

HIGHEST U.S.A. QUALITY . .

5 Licensed Manufacturers Of Ideco Drilling Equipment

Drilling contractors the world over are now buying equipment of their choice with the currency of their choice. Ideco masts, drawworks, pumps, rotaries, crown and traveling blocks . . . entire rigs . . . are being built by five European licensees. These firms were especially selected for their outstanding ability and long experience as European industrial leaders. They produce equipment that is designed, inspected, tested, serviced and fully guaranteed by Ideco and affiliates, and all components are completely interchangeable with other Ideco equipment built in the U.S.A. Think what this means to your foreign operations – equipment you *know* is tops – replacement parts close at hand – your choice of currency – guaranteed performance! To get the full story, include an Ideco proposal in your next equipment purchasing program.

... Made in Europe!



.. available from these manufacturers

Nuovo Pignone, Florence, Italy
Pulsometer Engineering Co. Ltd., Reading, England
Batignolles-Chatillon, Paris, France
Woodfield Rochester Ltd., Rochester, England
Schoeller-Bleckmann Steelworks, Vienna, Austria

WORLD-WIDE SALES AND SERVICE

HEADQUARTERS – 31st Floor, Republic National Bank Building, P. O. Box 1331, Dallas 21, Texas – Telephone Riverside 1-1031, Cable IDECO.

MAIN PLANT, U.S.A. – 1800 Laurel Ave., Beaumont, Texas.

EXPORT OFFICES – Dallas and Houston, Texas; New York City, New York.

CALIFORNIA OILFIELD SALES – Ideco Sales and Service, Inc., Long Beach, California.

LATIN AMERICA – Sales Representative, Dresser A. G. – *Argentina:* Buenos Aires; *Brazil:* Rio de Janeiro; *Mexico:* Mexico, D. F.; *Peru:* Lima; *Venezuela and Colombia:* (A-Z Export, representative) Maracaibo, Puerto la Cruz, Bogota; *Trinidad:* San Fernando.

EASTERN HEMISPHERE – Sales Representative, Dresser A. G. – *Austria:* Vienna; *Egypt and Middle East:* Lebanon, Beirut; *France:* Paris; *Germany:* Hannover; *India:* New Delhi; *Italy:* Rome; *North Africa:* Algeria, Algiers; *Spain:* Madrid; *Turkey:* Istanbul; *United Kingdom and Holland:* London (Ideco-Woodfield); *Yugoslavia:* Belgrade; *Thailand:* Bangkok; *Taiwan:* Taipei; *Japan:* Tokyo.

There is no Substitute for Quality

IDECO®

P. O. BOX 1331 • DALLAS 21, TEXAS

NETHERLANDS

EXPLORATION: An extremely good gas find during late 1960 brought a wave of applications for licenses across the channel in England, based on the long chance the producing formation might extend that far. NAM discovered reserves of gas which rank as one of the most important gas finds of Europe. Two separate finds were made by the operating company, N. V. Nederlandse Aardolie Mij. (NAM). One of the finds is Delfzjil 1, across the Ems River from Emden, West Germany. The second is at Slochteren, where two successful wildcats have been drilled between Groningen and the mouth of the Ems River. The Slochteren gas is apparently obtained from a carboniferous formation called the Lower New Red. The field is on a separate structure from the Delfzjil find 25 to 30 miles to the east, and the pay is deeper. NAM plans to drill more wells in the area west of Groningen near the village of Grootegast, and further south near Diever in Drenthe Province.

Natural gas produced by NAM, the only operator, is purchased at the wellhead by the government, and through state-owned pipelines and resold to municipalities which use it to enrich town gas. Deliveries to the government in 1959 averaged 18 million cubic feet daily, out of 40 million cubic feet available. Reserves at two trillion cubic feet could supply 275 million cubic feet of gas daily for 20 years.

NAM plans to extend its exploration offshore, and has already made a marine seismic survey off the south coast. Three locations for offshore wells have been picked for 1961 drilling and a mobil platform, the "Triton" will be operated. Sites 5 to 10 mi. offshore have been picked for the three wildcats and application to drill the tests in extraterritorial waters off the coast between Noordwyk and Kykduin have been filed by NAM.

History: During World War II oil discoveries in western Germany were found to extend across the border into Holland. The Schoonsbeek field was opened in 1943. It, together with subsequently discovered areas, is operated by N. V. Nederlandsche Aardolie Mij., a company shared equally by Royal Dutch Shell and Standard Oil of New Jersey, which is the only organization exploring in the Netherlands. Few wells were drilled by Shell before the war, but in the 1947-1959 period some 147 exploration and 409 exploitation wells were drilled. The best field found, Schoonebeek, appears to have passed its peak production of 26,000 b/d in 1957, though it will continue as an oil producer for many years. Natural gas was also encountered in Schoonebeek and other areas to the west, Coevorden, De Wijk and Wanneperveen. The oil-bearing horizon of Schoonebeek lies at about 2,500 ft. and the bulk of production of 25° API oil is lifted by pumping due to the large volume of produced water and the low gas/oil ratio.

Since 1953 exploration has been extended to other regions of Holland. At Rijswijk, in the area Rotterdam-The Hague-Leiden, drilling disclosed an oil formation at about 4,900 ft. Other fields were subsequently developed at Pijnacker, De Lier, Wassenaar, and Ijsselmonde. Holland's oil production in 1959 exceeded 1¾ million metric tons (about 35,000 b/d) and natural gas production increased to about 188 million cu. m. (cubic meters.)

Drilling conditions in the Dutch fields do not present any special problems, but unstable formations in some areas require a very good quality oil-emulsion mud with a low water-loss factor. Depths in the various fields are from 2,500 to 6,500 ft and the deepest exploration well was taken to 12,450 ft. The turbo-drill has been used in several tests, utilizing diamond bits in the harder formations.

A new development in drilling equipment by BIPM engineers has operated successfully in the Dutch fields, showing economies in costs and speed of operations. BIPM has worked on the principle of utilizing electric power as a central power plant on lines corresponding to the central plant formerly provided on steam rigs by the battery of boilers. A d.c. diesel-electric drive system in which all d.c. generators and motors are connected in series was developed. The generators are driven at constant speed by the diesels, and speed regulation is obtained at the motors instead of at the generators, so that the total power required for the various services is evenly distributed over all the generator sets that are in operation. This "d.c.-ring" system has been installed on a National 55 rig with one 850-h.p. slush pump and a standby pump of 400 h.p. With the first rig eight holes to an average depth of 5,200 ft have been drilled in about a year's time in the vicinity of Ridderkerke, 10 miles east of Rotterdam, including deviated holes.

PRODUCTION: During 1960 production is estimated at 35,200 b/d. Production during the first six months was 34,356 b/d, and at the year's end had risen to over 37,000 b/d. There are now a total of 16 small fields. Latest find for oil is the Lekkerkeek field, discovered in early 1960. It was producing about 12 b/d of 19.7 gravity oil at the mid-year.

Crude oil production has continued to rise, offsetting the decline at Schoonebeek field, and active exploration has continued, resulting in the discovery of new gas sources. Together with development drilling recorded, the 69,678 feet of exploratory drilling provided a total of 220,663 feet of hole in 1959.

Crude oil output increased by 8.5% to 33,565 b/d in 1959 compared with the previous year. Schoonebeek field oil production declined 10.1% from 22,181 b/d in 1958 to 19,942 b/d in 1959. Production from the newer western Holland fields increased 55.8% from 8,743 b/d in 1958 to 13,623 b/d in 1959.

Natural gas production in 1959 amounted to 7,411,381 mcf (203 mmcf daily). Of this, 5,903,550 mcf (162 mmcf daily) was produced in the eastern Netherlands, and 1,507,831 mcf (4.1 mmcf daily) was produced in western Holland. Ten gas wells were on production at the end of 1959.

REFINING: Annual throughput capacity of the Netherlands' three refineries, all in the Pernis-Botlek area of Rotterdam harbour, is at present 23 million tons (460,000 b/d). It will be raised to over 25 million tons when the capacity of Caltex's refinery of 2½ million tons a year is doubled by the addition of a second 2½ million tons distillation unit almost completed. The 16 million tons (320,000 b/d) refinery of Royal Dutch/Shell is by far the largest in Europe, its petrochemical plants including capacity to produce 15,000 tons of synthetic glycerine a year and 50,000 tons of rubber. Esso's new refinery has a capacity of 4½ million tons. Royal Dutch/Shell, Caltex, and Esso are all erecting large terminal facilities at Europoort which will be connected by pipeline to their refineries.

In 1959, Netherlands refineries treated 1,773,000 tons of indigenous and over 12.6 million tons of imported crude, with imports of products, mainly black oils, totalling five million tons and exports of products nine million tons. The volume of oil (crude and products) moving through Rotterdam for distribution in Germany, France and Switzerland was of the order of 4½ million tons in 1959 but will be much higher when the Rotterdam-Rhine/Ruhr pipeline with a present rated capacity of 8.5 million tons a year is in full use.

Petrochemicals: Plans call for a styrene-butadiene latex plant to be constructed in Rotterdam by Dow Chemical's Dutch subsidiary in Third Petroleum Harbor at Rotterdam. Investment in the new plant will total more than $2 million. Completion of the plant is scheduled for early spring of 1961.

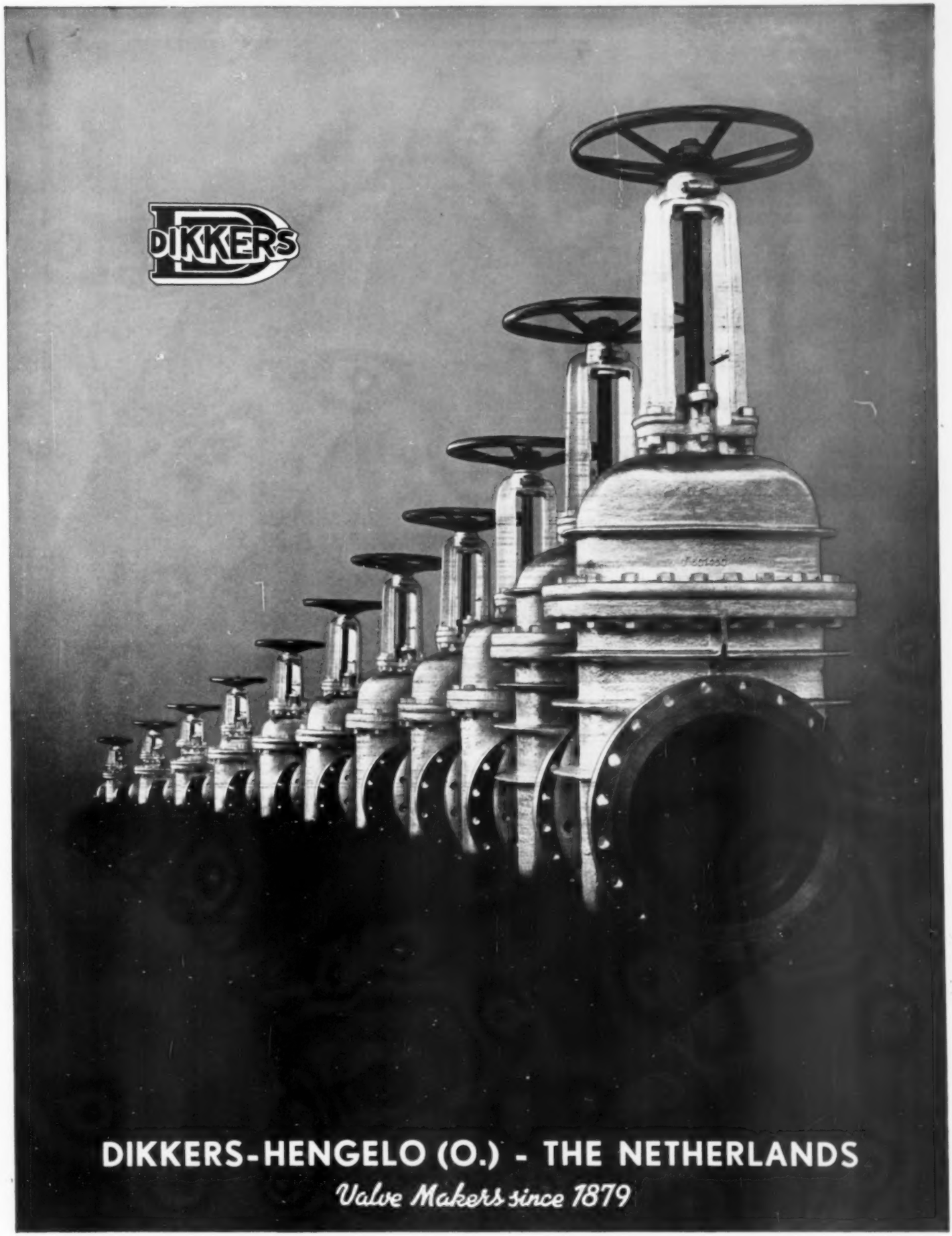
Royal Dutch-Shell opened a new $28 million 60,000-ton-per-year synthetic-rubber plant near its big Pernis refinery during 1960. Facilities include styrene, butadiene, and styrene-butadiene units.

A joint affiliate of Royal Dutch Shell and Italy's Montecatini will build and operate a polypropylene plant as part of Shell's Rotterdam refinery. Montecatini will supply patents, with Shell handling marketing.

Netherlands State Coal Mines and Dow Chemical Co. will build a jointly owned phenol plant near Rotterdam. Part of the output will be marketed by Dow as phenol, while the rest will be sold to Algenene Kunstzije Unie as an intermediate, caprolactam, in the manufacture of nylon.

Chemical Construction (G.B.), Ltd. will build a plant to decompose sulfuric acid sludge produced at Royal Dutch-Shell's refinery at Pernis. The firm is a wholly-owned subsidiary of Chemical Construction Corp., New York.

TRANSPORTATION: The second of Europe's two major crude pipelines from the North Sea to the German Ruhr was officially opened in 1960. The line from Rotterdam has 170,000 b/d initial capacity. Shell owns 40%, Caltex, 20% and Gelsenberg and Mobil together, 40%. The other major line, from Wilhelms-



IN CANADA: G. DIKKERS OF CANADA LIMITED, SCARBOROUGH, ONTARIO

from 4 to 150 tons payload the Berliet chassis will haul the heaviest and bulkiest loads that can be transported

berliet

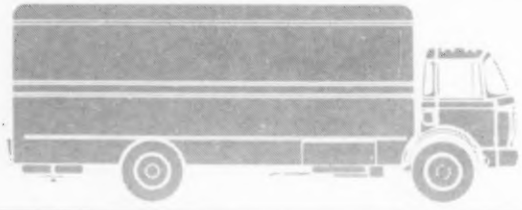
All the Berliet chassis, except the GAK, are designed for continuous duty to tow trailors of 6 to 16 tons gross weight, according to the chassis model

LYON, usines à Vénissieux (Rhône) Services " export " 160 à 192, bd. de Verdun Paris-Courbevoie

The range corresponding to the new European Highway regulations

4, 5, 6 t

GAK 4	83 ch
GAK 5	100 ch
GAK 5R	100 ch



7 t

GBK	120 ch

10 t

GCK	150 ch

PUBLICITS

The range in conformity with the french road regulations

8 t 7
10 t

GLC 120 ch
GLR 150 ch

10 t 75

GLM 180 ch

16 t

GPRK 180 ch

Road tractors

15/32 t*

** Gross semi-trailor weight*

TBK 120 ch
TLC 150 ch
TLR 180 ch
TLM 10 180 ch
TLM 15 240 ch

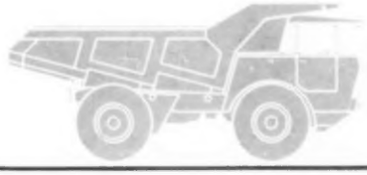
Cross country vehicles and industrial machinery

5/7 t

GBK 4 x 4 120 ch
GLC 4 x 4 150 ch

7/11 t

GBC RM 6 x 4
or 6 x 6
150 ch



15/80 t

GLM 6 x 4 180 ch
GBO 6 x 4 et 6 x 6
240 ch and 320 ch
T 25 320 ch
T 100 700 ch

Exceptionnal haulage

80 t
150 t

TBO 6 x 4 240 ch
and 6 x 6 320 ch
T 100 700 ch

The only manufacturers of
Seamless Steel Tubes
in the Netherlands

N.V. RIJNSTAAL v.h. J. W. OONK & Co.

Tel. 24941/45
Telex: 32149

ARNHEM

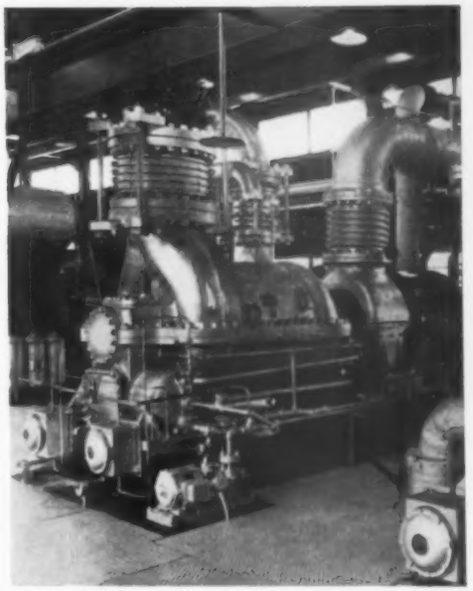
Cables RIJNSTAAL

THOMASSEN

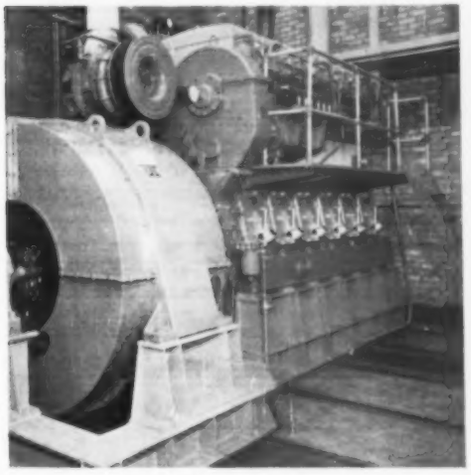
DE STEEG / HOLLAND

Heavy-duty Equipment for Oilfield and Petro-chemical Industry

Gasturbines 3,250-22,500 HP of the simple open cycle, without regenerators. Manufactured under license of Westinghouse Electric Corporation, U.S.A.



Centrifugal compressors 500-10,000 HP. Multi-stage compressors with closed-type impellers. Special materials and seals for all types of gases up to 2500 p.s.i.g. Built under license of Carrier Corporation, U.S.A.



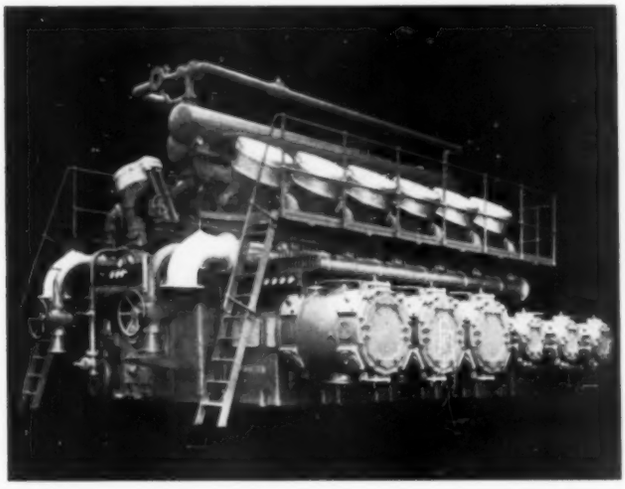
Gas and diesel engines 15- 4,000 HP. A wide variety of models and sizes. Suitable for electric power generation, oil well drilling, pump- and compressor drives.

Other

THOMASSEN

Oilfield Supplies:

- Vacuum-pressure relief valves for storage tanks and tank cars
- Deepwell liner pumps
- Slotted screen pipes
- Wire wrapped screen pipes



Reciprocating compressors and gas engine compressors 200-4,000 HP. Rugged construction and compact design. Horizontal, double acting compressors for individual drive and integrally built with a 4 stroke gas engine, normally aspirated and turbo-charged with scavenging system for additional internal cooling.

Beam-type pumping units 10,000-30,000 lbs pol. rod load built for year-around operation. Gear reducers rated to the latest edition of API Std 11E. Plunger pump lubricated pitman bearings, free swinging pitman trunnion and ground-level oil replenishment system. Gauge-bored structural parts which facilitates storage before erection.

For details and full information please apply to **N.V. MOTORENFABRIEK THOMASSEN / DE STEEG / HOLLAND**

haven, Germany, was opened last year by Esso British Petroleum, and a group of German countries.

MARKETING: Completion of Esso's refinery at Rotterdam, and final touches put on the 300 km 24-inch crude oil pipeline from Rotterdam to refineries in the Rhine/Ruhr area, has enlarged the Netherlands' oil trade. About 31 million metric tons (about 600,000 b/d) of crude oil and products moved into Rotterdam harbour in 1959. To handle the expected rise in oil movement and in other requirements, a new major port extension, Europoort, extending over 3,750 acres or nearly six square miles, is under construction near Rotterdam, close to the North Sea. It will begin to function in 1961, and will be able to accommodate 65,000 ton tankers to begin with and, eventually, 100,000 ton tankers. In terms of volume of cargo handled, Rotterdam is Europe's largest, and the world's second largest seaport (after New York). Half the cargo is oil.

Inland consumption of petroleum products in the Netherlands has doubled in five years, reaching 7,320,000 tons in 1959 and an estimated 8,200,000 tons (about 164,000 b/d) in 1960. Demand for black oils, notably fuel oil, has risen most rapidly, now accounting for about two-thirds of the inland consumption of all products.

Shell, Esso, Caltex, Purfina, B.P., and Gulf have networks of service stations. Several new companies, including Total (CFP), Mobil, the coal trading association P. A. M., and the Dutch cooperatives compete seeking to get a foothold in the market by offering heavy rebates to large consumers. The present ex-pump price of ordinary grade gasoline at The Hague is Fls. 0.457 per litre of which Fls. 0.274 represents taxes and duties: exclusive of these, the price is still virtually the same as in the early 1950s, although the general price level has substantially risen.

OIL LAWS

No changes occurred in the Netherlands oil regulation during 1960. For an excellent résumé of the oil legal picture, recommendation is made of *Petroleum Legislation*, a legislative reference service which contains a summary and analysis of the Netherlands law, along with the laws of most other countries of the world. The original volumes are kept current by loose-leaf revisions, making the service continuously useful. Inquiries regarding the service should be addressed to the publisher, *Petroleum Legislation, Ltd., Post Office Box 1591, Grand Central Station, New York 17, New York.*

CONSUMPTION OF OIL
(Thousand Metric Tons)

	1954	1957	1958	1959	1960 Estimate
Motor Gasoline	807	978	1,037	1,120	1,170
Domestic Kerosine	190	278	366	410	480
Tractor Kerosine	49	43	46	40	40
Gas/Diesel Oils	845	1,381	1,626	1,880	2,100
Fuel Oil	1,129	2,154	2,544	3,000	3,400
Lubricants	89	112	115	125	130
Liquid Gas	67	119	140	165	850
Other Products	451	482	518	580	
Total	3,627	5,547	6,392	7,320	8,170
% Inc. over preceding year	16.7	2.8	15.2	14.5	11.6

NETHERLANDS—OIL OPERATIONS BY N. V. NEDERLANDSE AARDOLIE MAATSCHAPPIJ
(Covering First Half 1960)

Name of field (or producing area)	Schoonebeek	Rijswijk	Andel	Delft	Berkel	Pijnacker	De Lier	Wassenaar	IJsselmonde	Ridderkerk	Zoetermeer	Moerkapelle	Alblasserdam	Werkendam	Meyendel	Leiderkerk
Year of discovery	1943	1953	1953	1954	1954	1955	1955	1956	1956	1957	1957	1957	1957	1958	1958	1960
Footage drilled during period	23,172	—	—	—	—	—	4,758	—	33,767	8,776	—	—	—	—	—	—
Wells completed during period																
a. Oil wells	7*	—	—	—	—	—	—	—	9	2	—	—	—	—	—	1
b. Gas wells	—	—	—	—	—	—	1	—	2	—	—	—	—	—	—	—
c. Dry holes	1**	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
d. Suspended	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Wells actually drilling at end of period	—	—	—	—	—	—	—	—	1	1	—	—	—	—	—	—
Drilling wells suspended at end of period	—	—	—	1	3	1	13	22	4	—	—	—	—	—	—	—
Flowing wells at end of period	—	—	—	2	3	3	1	2	—	—	7	4	—	1	—	1
Pumping wells at end of period	276	6	—	—	—	17	—	—	—	—	—	—	—	—	—	—
Other artificial lift wells at end of period	18	16	5	8	3	11	32	22	29	12	9	7	1	1	1	1
Wells drilled to end of period	359	2,500 & 5,100	3,100 & 4,800	3,100 & 3,800	3,100 & 3,700	5,800	5,200	4,200	3,100	3,100 & 5,000	3,200	2,400 & 3,200 3,800 & 4,400	4,800	6,500	4,200	—
Producing depths at end of period in feet	2,500															
Gross clean crude production during period in barrels	3,286,575	115,170	—	4,219	12,300	172,072	321,477	831,669	1,215,317	64,537	193,452	14,853	7,828	5,200	5,011	2,195
Average production during last month of period in b/d	17,491	536	—	22	67	1,031	1,771	4,362	9,001	282	1,187	66	—	27	53	—
Cumulative production up to end of period in barrels	77,320,572	2,294,852	5,948	104,573	147,158	1,888,719	1,829,493	3,669,108	3,677,438	228,603	764,691	73,206	20,659	22,407	31,111	2,195
Base of crude	Paraffin	Paraffin	Paraffin	Paraffin	Paraffin	Paraffin	Paraffin	Asphalt	Paraffin	Paraffin	Asphalt	Asphalt	Paraffin	Paraffin	Asphalt	Paraffin
A.P.I. gravity of crude	25.0	23.5 & 32.3	12.7 & 31.7	32.5 & 31.9	32.1	36.3	34.5	18.4	19.8	26.6	16.5	14.1 & 16.7 & 29.3	25.2	33.0	18.2	19.7
Age and type of producing formation	Low. Cret. (sand)	Low. Cret. (sand)	Jurassic (Calc. Sst. & Sandst.)	Low. Cret. (sand)	Low. Cret. (sand)	Low. Cret. (sand)	Low. Cret. (sand)	Low. Cret. (sand)	Low. Cret. (sand)	Low. Cret. (sand)	Low. Cret. (sand)	Low. Cret. (sand), & Jurassic (Calc. sandstone)	Jurassic (sand)	Jurassic (siltstone)	Low. Cret. (sand)	Jurassic (sand)

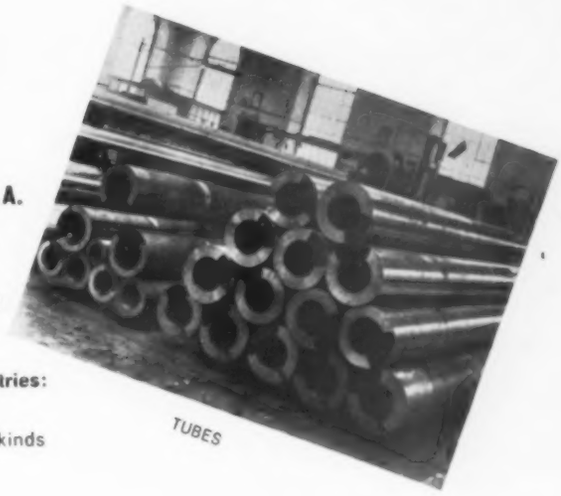
* = Wells in the Handlo-sand in situ combustion area. ** = Water injection well. Source: Shell Group semi-annual report.

ARBED

ACIÉRIES RÉUNIES
DE
BURBACH-EICH-DUDELANGE S. A.
DIVISION OF DOMMELDANGE
(Grand Duchy of Luxembourg)

recommends its products

RUDDERSHAFT



TUBES

for petroleum- and all other industries:

Shaft lines for ships of all kinds

Ruddershafts for ships

Accessory pieces
for marine dieselmotors like
piston rods and -heads

Single and multiple
crankshafts

All kinds of special steels

Turbine shafts and
turbine rotors

Tubes in ordinary, heat resisting
and stainless steels
forged plain, turned and bored

Gear units

Gas-, steam-
and waterturbines
in ordinary and alloyed steels

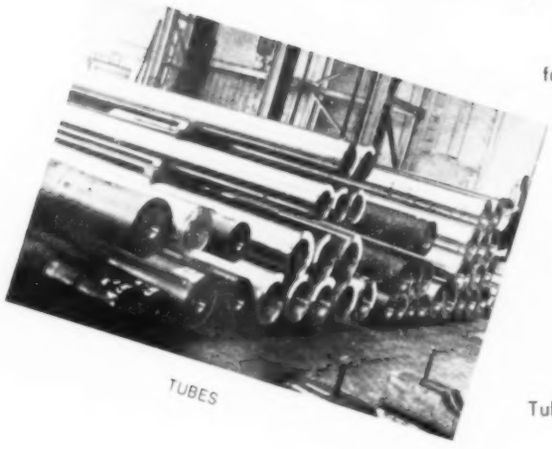
Wear resisting sheets
with low
or 12% manganese content

Machine shafts for every use

Gas-, air-, oil- and fluid-
storage tanks

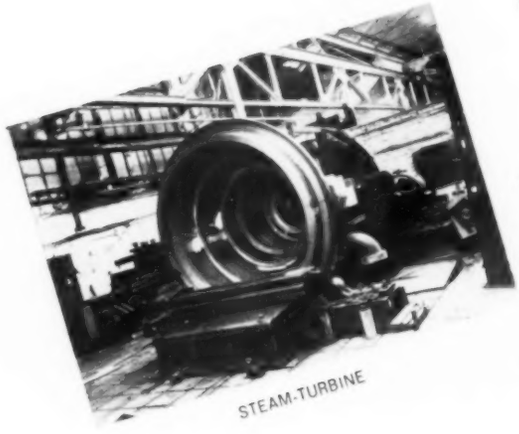
Mounting and assembling of
all kinds of steel constructions

Electrical locomotives



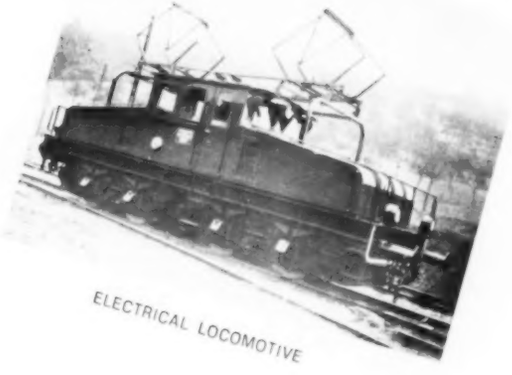
TUBES

GEAR UNITS



STEAM-TURBINE

STORAGE TANKS



ELECTRICAL LOCOMOTIVE

DIESELELECTRICAL LOCOMOTIVE

○

AGENCIES IN ALL COUNTRIES

PORTUGAL

EXPLORATION: Socony Mobil gave up its joint effort with Cia. dos Petroleos de Portugal after 17 unsuccessful wells had been drilled between mid-1955 and 1959. Cia. dos Petroleos de Portugal, the government company, with the Axel Johnson interests of Sweden, still holds the exploration concession, however. (see map in *WPR 1958,* p. 53).

PRODUCTION: There is no local production, except some limited asphalt mining. One of the Portuguese territories, Angola, has oil production. For a description, see Angola section in this edition of WORLD PETROLEUM REPORT.

REFINING: There is one plant, which belongs to SACOR (government 33 1/3%, CFP 8¾%, and private interests 58%). Capacity of the SACOR Refinery is 29,000 b/d, and enlargement up to 37,000 b/d is being carried on. The refinery has a catalytic cracking unit with a capacity of 11,000 b/d; a catalytic polymerization unit with a capacity of 190 t/d; and an asphalt oxidation unit, plus several other crude treatment units.

The expansion of facilities at SACOR's refinery near Lisbon is scheduled for completion early in 1961. Purpose of the expansion is to increase the output of propane and butane needed to supplement manufactured gas for Lisbon.

Petrochemicals: A 40,000-metric-ton urea plant will be built by Montecatini and Uniao Fabril do Azoto at Labradio, near the town of Barreiro. The plant will use the Fauser-Montecatini process, and is being engineered by M. W. Kellogg Co.

Two plants adjacent to the Cabo Ruivo refinery are to be completed in 1960-61. Sociedade Portuguese de Petroquimica plans to produce ammonia, town gas, and hydrogen at projected daily rates of 170 tons, 300,000 cubic meters, and 40,000 cubic meters, respectively. Nitratos de Portugal will use part of this ammonia output for the production of fertilizers-calcium ammonium nitrates with 20.5% nitrate content—at an estimated rate of 100,000 tons a year. Those two companies have been especially formed for the purpose, the former with a capital of escudos 150 million, and the latter with escudos 70 million, the respective capital shares of SACOR being 60% and 25% of the total.

Amoniaco Portugues already produces 80 tons ammonia a day through the gasification of low-octane gasoline from SACOR's refinery, in addition to 45 tons ammonia daily by means of electrolysis.

Uniao Fabril do Azoto, of the Portuguese CUF group, which already produces 50 tons ammonia daily by electrolysis for the purpose of making ammonium sulfate, has now been authorized to produce, additionally, 170 tons a day of ammonia, partly from coke-oven residual gases from the new national steel works due to be in operation in 1961, and partly from petroleum feed stocks. This output will be used in part for the production of calcium nitrates with 20.5% nitrate content, at a rate of 100,000 tons a year. It is as yet uncertain whether the petroleum feed stocks will be obtained from SACOR or be imported.

MARKETING: SACOR has exclusive right of oil refining in metropolitan Portugal, coupled with the right to supply 50% of the inland market for petroleum products. The majority of SACOR's shares is owned by local financial interests, but the Portuguese State has one-third interest, and some years ago Cia. Francaise des Petroles acquired 8.75%. SACOR's refinery has at present a rated capacity approximately equivalent to total inland demand, though some imports of petroleum products are still made. Crude-oil imports are almost entirely from Iraq. A large part is processed for the account of other companies who market locally. Local marketers, other than SACOR, are Mobil Oil, Shell, BP, and the local concern SONAP. Liquid gas has hitherto been exclusively handled by CIDLA, a subsidiary of SACOR, but Shell is now entering the market.

Most of the oil imported is now carried in vessels belonging to SOPONATA, a local joint venture of oil companies and shipowners, with SACOR holding a 25% share. SOPONATA has now 10 ocean-going tankers, with a deadweight tonnage of 190,000, and one coastal tanker.

It is estimated that inland consumption of petroleum products will increase by about 38% [from 1,265,000 tons (25,300 b/d) in 1959 to 1,750,000 tons (35,000 b/d) in 1964]. Hydroelectricity production will rise by about 10% (from 2,864 million to 3,150 million kwh), with coal supply remaining more or less static. Oil would then account for about half the total energy consumption, with a further rise in inland consumption of petroleum products to 2.2 million tons (44,000 b/d) indicated for 1969.

Oil consumption in recent years has risen slowly. Over the period of the first economic plan, the annual level of inland consumption rose by 420,000 tons, or 65%. There was a 6½% rise to 1,263,000 tons (25,260 b/d) in 1959. These increases are much smaller than in the OEEC area as a whole, where inland consumption of petroleum products doubled during 1953-58 and rose by 13% in 1959.

OIL LAWS

For a detailed and highly recommended study of petroleum industry legislation and regulation within Portugal and its overseas territories (13 times the size of the mother country), the editor highly recommends *Petroleum Legislation.* This is a legislative reference service containing a summary and analysis of the oil laws and other industry regulation for every major country of the world. The national sections are prepared by legal counsel recommended by oil companies which have actually operated within Portugal and within other countries concerned. The same oil-law firms keep their reviews up-to-date by loose-leaf revision service. For information on this excellent service, the publisher may be contacted directly at: *Petroleum Legislation Ltd., P. O. Box 1591, Grand Central Station, New York 17, N. Y.*

NATIONAL FACTORS

Portugal is a benevolent dictatorship, one of the oldest in the world, under Salazar. Political democracy has not been practiced, but considerable economic progress has been made.

The country's fiscal policy has been extremely conservative. A favorable balance of payments has been maintained, and the escudo strengthened. National income has risen by about 3.4% annually (or 22% in all) during 1953-58—the period of Portugal's first economic six-year plan—and a similar rate prevailed in 1959. The second six-year plan, for 1959 to 1964, foresees *average* increases of 4.2%, or a total increase of about 28%. The need for more rapid economic progress arises partly from Portugal's membership in the Free Trade Assn. which imposes the obligation to eliminate over the next few years many of the country's high protective duties *vis-à-vis* the United Kingdom, the Scandinavian countries, Switzerland, and Austria. END

SICILY

EXPLORATION: Interest in Sicily has declined a little because no new discoveries have been made since ENI found the Gela field. Gulf has the biggest producing field in Sicily, producing about 23,000 b/d but has reduced its exploratory acreage also and applied for permission to reduce still further.

Cia. Idrocarburi della Sicilia d'Arcy (Cisda), an affiliate of British Petroleum Co., has given up altogether in Sicily, including its Victoria permit. However, a member of the Italian State-owned ENI group, Societa Ravennate Metano, applied for the vacated Victoria permit. Cisda is also giving up its San Pietro permit. The Chiusa Sclafani permit by another ENI affiliate, SAIPEM, and the Alessandria della Rocca permit by Societa Indrocarburi Siciliani, were also given up.

Of 208 tests drilled in Sicily, 114 were dry, while 69 found oil and 25 gas during the period from 1945 to September 30, 1959.

Gulf Italia and Joint Companies Activity—1960: During 1960, Gulf Italia Co. drilled in the Ragusa field three development wells which encountered the reservoir rock at top of the structure. They were directional wells, as it was impossible to locate them in the areas desired due to the broken ground or to existing industrial plants.

A total of 53 wells has been drilled in the Ragusa field, and all of them but four are oil-producing.

During the first nine months of 1960 a total of 995,351 metric tons was produced from the reservoir. Production during 1960 is estimated at 1,250,000 metric tons (23,048 b/d).

Gulf Italia has also drilled, within the Ragusa concession, three wildcats: Margherita-1, Grammichele-1, and Cono-1—thus testing three different structures (end of company summary).

A structure hole, Conte S-1, has been drilled in the "Comiso" permit belonging to Mediterranean Oil Co., which had been associated with Gulf Italia. Both the "Comiso" permit and the "Caltanissetta" permit, owned also by MEDCO, expired in June 1960. The company's sole remaining interest in Sicily is its 2% overriding royalty interest in some 35,000 acres located between the Comiso permit and Gulf Oil Corp.'s Ragusa concession. On the basis of information received to date, it appears that Gulf

CALTEX

Caltex . . . serving every petroleum need in more than 70 countries in Europe, Africa, Asia and Australasia

world-wide* symbol of process construction . . .

in Europe

PROCON

in Africa

PROCON

in South America

PROCON

in Asia

PROCON

in North America

PROCON

The PROCON nameplate is a familiar sight on refineries and chemical plants just about everywhere in the free world. From small to large projects PROCON puts to work a finely coordinated team of engineers, procurement, inspection experts, and construction specialists to build precisely and expertly.

PROCON's world-wide process construction projects have included entire refineries, built from the ground up. Tankage, loading and dock facilities are typical off-battery installations built in conjunction with the processing units. Training schools for native workers in welding and other skills of construction are common challenges PROCON also takes in stride in building to specifications of the highest standards anywhere in the world.

If you are planning a petroleum refining, petrochemical or chemical project anywhere in the free world call on PROCON.

PROCON®

* Areas of the world where there are one or more PROCON construction projects.

PROCON *Incorporated*

1111 MT. PROSPECT ROAD,
DES PLAINES, ILLINOIS, U.S.A.

PROCON INTERNATIONAL S.A., CHICAGO, ILL., U.S.A.
PROCON (CANADA) LIMITED, TORONTO, CANADA
PROCON (GREAT BRITAIN) LIMITED, LONDON, ENGLAND
PROCON PTY. LIMITED, SYDNEY, AUSTRALIA
PROCOFRANCE S.a.R.L., PARIS, FRANCE
PROCON LIMITADA, SAO PAULO, BRAZIL
PACIFIC PROCON LIMITED, MANILA, P.I.
VICAPROCON, S.A., CARACAS, VENEZUELA

TOYO KANETSU SETS A NEW RECORD

200

TUBESEALS

TOYO KANETSU, Japan's leading fabricator of steel plate vessels and licensee for Hammond Tubeseal Systems*, sets a new record for Tubeseal installations throughout the Far East... more than 200, ranging in capacity from less than 2,000 barrels to more than 315,000 barrels for safe storage of gasoline, petrochemicals and other volatile products.

At least 25 of these 200 Tubeseals have a capacity of 150,000 barrels, or more. ***Patented**

Send today for Bulletin.

PDM

Pittsburgh-Des Moines Steel Company

12 plants to serve you coast to coast

PITTSBURGH, WARREN, BRISTOL, PA. • BALTIMORE • BIRMINGHAM • DES MOINES
PROVO, UTAH • CASPER, WYO. • SANTA CLARA, FRESNO, STOCKTON, CALIF.

HAMONDTANK

Sales Offices: Atlanta 5 • Baltimore 26 • Boston 10 • Bridgeport 5 • Chicago 3 • Dallas 1 • Denver 2 • Des Moines 8 • El Monte • Fresno • Jacksonville • Los Angeles 57 • Newark 2 • New York 17 • Pittsburgh 25 • Sacramento • Santa Clara • Seattle 1 • Stockton licensees and sales offices in many foreign countries including Argentina, Chile, Australia, Belgium, Brazil, Canada, Colombia, England, France, Haiti, India, Italy, Japan, Mexico, Netherlands, Peru, Puerto Rico, Sweden and W. Germany.

has no present plans for further drilling on this acreage.

Companies operating include Gulf, which found the Ragusa field; Edison of Italy; ARPE (Esso and an Italian firm); Getty; Macmillan; and ENI, which found the Gela field. BP gave up its concession recently.

French participation in the Sicilian oil search covers an agreement for joint exploration between Petropar (BRP 60%) and SIT, a member of the Italian Edison group.

The German (partly State-owned) Preussag has acquired four exploration concession areas, totaling 230,000 acres in Sicily, two of them near Palermo, and two in central Sicily to the north of the Gela field. Geophysical work has begun.

Reserves: There are two fields of petroleum reserves, Ragusa and Gela. Gulf officials have placed reserves of the Ragusa field in the 20 to 25 million metric tons class (125 to 155 million barrels). In response to questions, ENI officials replied that estimates for Gela would be premature at this time; however, they estimate they are slightly larger than Ragusa reserves. An estimate of total reserves is made, therefore, at 300 million barrels, proved and recoverable.

PRODUCTION: Production in Sicily is estimated at 40,000 b/d during 1960. Of this, 23,048 b/d were from Gulf's Ragusa field, the remainder from Gela.

REFINING: Sicily has two refineries, RASIOM's 100,000 b/d plant at Augusta and AGIP's 3500 b/d refinery at Gela.

Sicily's regional government has authorized SA Mediterranea Raffineria Siciliana Petroli to build a new refinery at Milazzo in the northwestern section of the island. Expected capacity is 2.6 million tons yearly (about 50,000 b/d).

A new ethylene plant, built for Sincat SpA at Priolo, went onstream in 1960. It is part of Sicedison's Italian petrochemical complex.

Anic Gela SpA, a new subsidiary of ENI, will build a petrochemical plant to process three million tons of heavy bituminous crude from the Gela field exploited by Agip Mineraria. A connected thermoelectric plant, fed by coke from a coking plant, will produce 150,000 kw. The project will produce the following products:

	Tons Per Year
LPGas	55,000
Light distillates (motor gasoline, kerosine, special products)	420,000
Gas and diesel oils	700,000
Fuel oils	470,000
Sulfuric acid	110,000
Ammonium sulfate	150,000
Urea	60,000
Tetramer propylene	4,000
Polyethylene	15,000
Ethanolammines and glycols	17,000

OIL LAWS

Sicily's regional government and ENI approved in 1960 reduction of the royalty for ENI on Gela oil to 4% for the next 15 years, and to 6% thereafter, from the original 20%. Reliable sources had predicted the projected three-million-ton-per-year production for Gela will have reached only 1.5 million in 1960. Official approval has been obtained for the 170-billion-lire plan for construction of a three-million-ton-per-year Gela petrochemical works (50% of the crude to be imported from Egypt), for a new port, and for other facilities.

For a detailed and highly recommended study of petroleum industry legislation and regulation within Sicily, the editor highly recommends *Petroleum Legislation*. This is a legislative reference service containing a summary and analysis of the oil laws and other industry regulation for every major country of the world. The National sections are prepared by legal counsel recommended by oil companies who have actually operated within the country concerned. The same oil law firms keep their reviews up to date by loose-leaf revision service. For information on this excellent service, the publisher may be contacted directly at: *Petroleum Legislation Ltd., Post Office Box 1591, Grand Central Station, New York 17, New York.*

OIL LAW SUMMARY[1]

Under the Sicilian constitution, the regional government was granted exclusive competence regarding mineral laws. In the early part of 1948 the central government opposed that article in the Sicilian constitution, and appealed to the Constitutional Court in Rome contesting its validity. The appeal was decided in favor of Sicily. In October 1949, Sicily drafted a petroleum law, enacted February 17, 1950. The government commissioner objected to this legislation as being in conflict with the national interest, and an appeal was again taken to the Constitutional Court in Rome. The Constitutional Court held in favor of the regional government on March 21, 1950.

Under the controlling Law No. 30 of March 20, 1950, published in the *Official Gazette of the Sicilian Region*, March 31, 1950, p. 81-83, there are two successive stages of oil and gas rights, as follows: (1) prospecting permit; (2) concession.

EXPLORATION: Number of Permits: No limitation. Maximum Area: Each permit must be a continuous area not exceeding 100,000 hectares (247,000 acres). If more than one permit is issued to same firm, total area shall not exceed 100,000 hectares. Term: Three years, with two extensions of three years each. **Reduction of Area:** Area of permit must be reduced by 20% at end of first three-year period, and by another 20% at the end of the second three-year period. **Surrender**—All or part may be surrendered at any time. **Work Program:** A program for prospecting work and mechanical exploration (i.e., structure drilling, etc.) must accompany application. **Drilling Obligation:** Commence mechanical exploration work within two years, and deep drilling within three years. **Annual Rental**—100 lires (16¢ U. S.) per hectare yearly, annually in advance. **Assignment:** Prospecting permits may not be assigned without prior authorization from the government. **Transfer Fee:** 50,000 lires ($80 U. S.). *Note:* Government may stipulate terms of concession in the permit. Terms and conditions are subject to negotiation.

Exploitation: After commercial discovery has been made, permittee is entitled to receive a concession.

Term: Not less than 20 years or more than 30 years. May be extended if obligations have been fulfilled. **Rental:** 500 lires ($0.80 U. S.) per hectare, annually in advance. **Royalty:** To be fixed by negotiation, between minimum of 4% and maximum of 20%, payable annually in cash or in kind. **Forfeiture:** Forfeiture may be decreed for following reasons: Nonpayment of rentals or royalty; failure to present concession application within required time; failure to meet drilling obligations (commence mechanical exploration within two years and deep drilling within three years from date of permit); suspension of development of the field for over six months; transfer of permit or concession without consent of the government; noncompliance with other obligations sufficiently serious to warrant forefeiture. **Concessions in force** as of the date of the 1950 law are governed by preceding laws. Prospecting permits already in force may be declared valid under the 1950 law, subject to the area limitation (100,000 hectares), taxes, and other conditions thereof.

Transportation: Construction and operation of a pipeline may either form part of an exploitation concession, as outlined above, or may constitute the object of a separate concession. The tax payable to the Sicilian region is to be determined in the concession.

[1]*Source: Petroleum Legislation*, P. O. Box 1591, Grand Central Station, New York 17, N. Y. This review of oil legislation contains a detailed summary similar to this Sicilian section for every country of the world, kept current by loose-leaf revisions.

GUIDO SARTORI S.p.A.

VENICE - ITALY

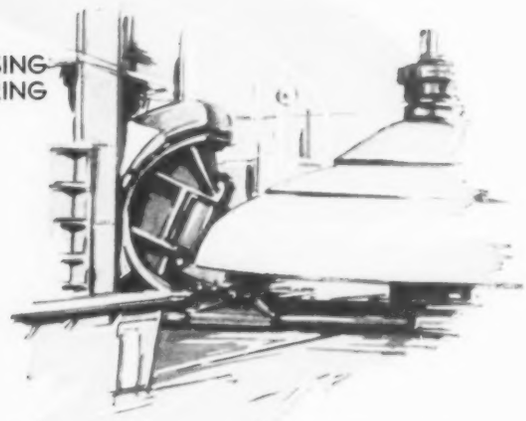
SAN MARCO 3752
TEL. 21424 · 21450

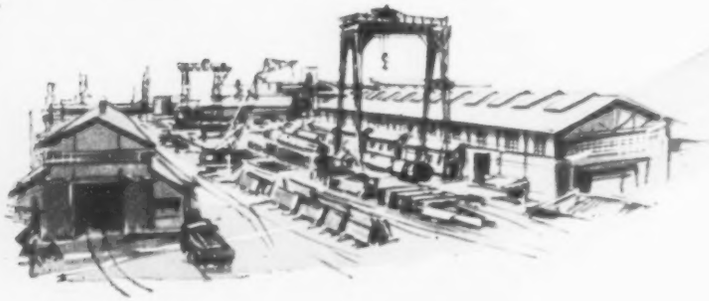
DISHED-FLANGED-ELLIPTICAL AND HEMISPHERICAL HEADS
UP TO 5¼" THICK AND 15'8 7/8" DIAMETER WITH "PRESSPUN" OF GUIDO SARTORI S.p.A. VENICE - ITALY

GUIDO SARTORI Co.

HAS MANUFACTURED, USING DESIGNS SUPPLIED BY INTERNATIONALLY KNOWN ENGINEERING FIRMS, EQUIPMENT FOR THE FOLLOWING COUNTRIES:

ANTILLES
ARGENTINA
BAHRAIN
BELGIUM
BERMUDA ISLES
COSTA RICA
CUBA
DOMINICAN REPUBLIC
EGYPT
ENGLAND
GREECE
HOLLAND
INDONESIA
IRAQ
ITALY
JAMAICA
YUGOSLAVIA
KUWAIT
MEXICO
PAKISTAN
SAUDI ARABIA
SUDAN
SWEDEN
TANGIER





CONSTRUCTION AND ERECTION OF:

OIL REFINERIES,
CHEMICAL AND
METALLURGICAL PLANTS,
CONVENTIONAL AND
NUCLEAR POWER STATIONS

C. I. P. I.

COSTRUZIONI IMPIANTI PETROLIFERI INDUSTRIALI

S. p. A.

VENEZIA - MARGHERA

(ITALY)

Design - Construction - Automatic Welding - X and Gamma Raying - Stress Relieving - Zinc Coating - Construction according to Asme - ANCC - UNIFER - -qRINa -LLOYDS REGISTER - DIN - ect. Codes.

Heat Exchangers, Coolers, Fractionating Towers, Complete Petroleum Refineries, Equipment and Piping in Carbon, Low-Alloy, High-Alloy, and Cladded Steels, Copper, Monel, Aluminum, Industrial Furnaces, Cooling Towers, Dryers, Pneumatic and Conditioning Installations. Autoclaves, Pressure Vessels, Boiler Drums and Complete Steam Generating Units.

Low and High Pressure Piping, Cylindrical and Spherical Tanks for L.P.G. storage, Cone and Spherical-Roof, Floating-Roof Oil storage tanks, Gas-holders, Industrial Silos, Steel Structures, Cranes, Road and Railway Bridges. Road, Railway, Sea and River Transportation

Dished, Flanged, Elliptical and Hemispherical Heads up to $5^1/_2$". Thickness and 15'8 7/8" Diameter.

ITALY

EXPLORATION: The Italian mainland saw a moderate amount of exploration during 1960. No oil discoveries were made, although one small gas field was found.

Exploitation concessions and exploration permits granted all over the Italian territory, including the islands, covered an aggregate area of 4,341,531 hectares, as of August 31, 1960. On that date, total area covered by applications still pending amounted to 2,851,300 hectares net (no overlaps).

The government has also filed 23 applications for exploration in offshore and territorial waters, covering a total of 2,720,000 hectares. These applications will not be taken into consideration until a law has been enacted on the exploration and exploitation of offshore petroleum deposits.

Agip Mineria and the Yugoslav Petroleum Assn. have agreed to set up a joint commission of experts to study the possibility of cooperating in oil exploration work in the Adriatic basin.

In **Sardinia,** a 3,500-square-mile concession covering the western half of the island, granted in 1957 to Societa per Azioni Idrocarburi Sardegna (SAIS), composed of private West German (Wintershall AG) and Sardinian government interests is in effect. Mapping and geophysical surveys are under way.

Cities Service and Pan American, operating as Adriatic Petroleum Corp., drilled three wells in Italy during 1960, as follows:

Cerignola No. 1—TD (total depth) 475.6 meters (1,560 ft), D and A in Tertiary (possibly Cretaceous) limestone. Spudded January 26, 1960; completed February 23, 1960.

Spinazzola No. 1—TD 682.4 meters (2,239 ft), D and A (drilled and abandoned) in Cretaceous limestone. Spudded June 18, 1960; completed July 9, 1960.

Stornarella No. 1—TD 769.3 meters (2,524 ft), D and A (drilled and abandoned) in Cretaceous limestone. Spudded July 16, 1960; completed August 11, 1960.

ENI Operations *(Abbreviation of Statement by Enrico Mattei, President of ENI):* Ente Nazionale Idrocarburi was set up February 1953. The State-owned company was granted exclusive rights to explore for, develop, and transport hydrocarbons in the Po valley. ENI has implemented an impressive exploration program in the Po valley leading to the discovery of a number of gas-bearing fields yielding today around six billion cubic meters of gas per annum, and has also extended its operations over the rest of Italy's mainland and to Sicily.

The main discoveries so far are the Gela oil field in Sicily in 1957 and the Ferrandina gas field in Lucania in 1959. ENI has constructed a natural-gas pipeline network; enlarged and modernized its refineries and products distribution system; built a big plant at Ravenna for synthetic rubber and nitrogenous fertilizers from natural gas; is beginning a nuclear power plant at Latina, and recently has been building another large petrochemical plant at Gela which will use local crude oil. ENI today controls over 70 subsidiary companies employing more than 21,500 people, and supplies 21% of the whole of Italy's energy requirements. In 1959, turnover was 361.1 billion lire, and the refineries in which it has an interest processed 5.4 million tons (180,000 b/d) of oil.

I believe that a great deal of the merit for this (ENI's) success must be attributed to the Italian corporation's line of action which does not follow lines laid down by the major international companies which, even when they are under government control, have nevertheless shaped their activities to fit in with private enterprise's conception of making utmost profits for the company. On the contrary, it constitutes an instrument through which a policy of economic development, beneficial to the whole country, can effectively be carried out. The spirit infusing ENI's activities has also brought about a new basis for relationships with the countries owning oil reserves. In securing its oil exploration rights abroad, ENI has not only offered the countries concerned better contractual conditions than usual, but has also offered them the chance of taking part, with absolute equality of rights, in exploiting their own resources to the full and thus in developing their own economies. I consider ENI's formula not so much as a means for a company to penetrate into some of the most sought-after oil-bearing regions, but rather as an initial step forward to more lasting relationships between oil-producing and oil-consuming countries. (End of Mr. Mattei's statement.)

$670.4 million is the budget for ENI in the four years 1960 through 1963. Expenditures are to include $179.2 million for exploration, production, transportation, and distribution of methane; $182.4 million for refining, transportation, and marketing; $192 million for petrochemicals; $80 million for the nuclear industry; and $36.8 million for miscellaneous.

An agreement between the government and ENI for the production of gas from Ferrandia field resembles that recently concluded in Sicily. It exempts ENI from all duties and royalties under the 1957 Petroleum Law on Ferrandia production. In return, ENI will pay all costs estimated at 40 billion lire (about $64 million), for utilization of one-third of the gas in a local plant (not specified); one-third of the gas is to be allocated at reduced prices to industrial activities in the area.

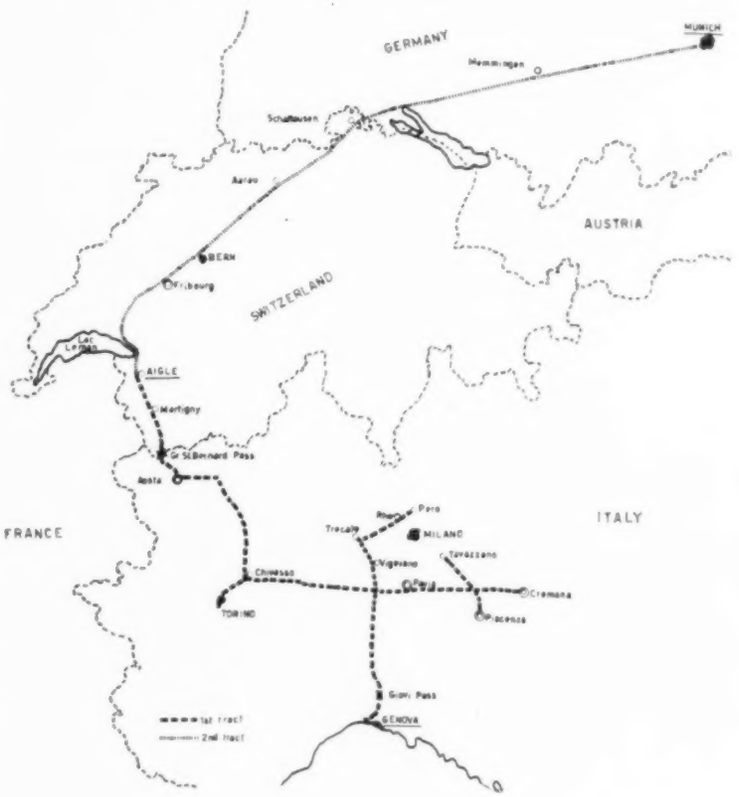
ITALY—Oil Consumption
(Thousands of Metric Tons)

	1959 Actual	1960 Estimate	1961 Estimate	1965 Estimate	% Change Annual Average 1961-65 Over 1960
Motor gasoline	2,025	2,500	2,800	4,150	13.2
Kerosine	158	200	163	190	3.75
Jet Fuel	180	190	200	280	11.11
Motor gas oil			2,180	3,020	9.98
Agric. gas	2,352*	2,700*	535	650	5.49
Marine gas oil			192	200	1.05
Fuel oil	8,550	11,800	12,800	18,400	13.45
Lubes	215	230	230	300	8.57
Bitumen	550	600	650	850	8.33
LP Gas	600	700	730	900	6.47
Others	264	350	514	1,276	40.62
	14,894	19,270	20,094	30,216	

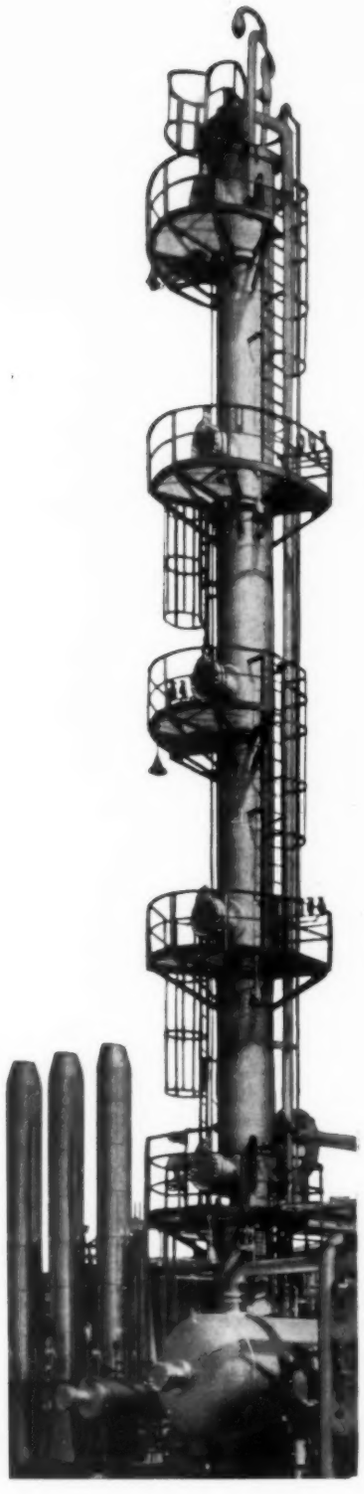
*All gas oils; no separation as to types.

ITALY—Projected New Processing Plants
(Metric Tons)

Company	Location	Planned capacity authorized by decree	Planned capacity + the 30% of reserve required by law	Date of completion
Mediterranea Raffinerie Siciliane Petroli	Milazzo	2,000,000	2,600,000	1961
Esso Standard Italiana	Pavia	3,000,000	3,900,000	Uncertain
SAICA	Porto Torres (Sardinia)	1,200,000	1,560,000	Uncertain
SORAP (Edison)	Cremona	4,000,000	5,200,000	Uncertain
ISLOM	Palermo	300,000	450,000	Uncertain
	Total	10,500,000	13,710,000	



FROM DESIGN TO CONSTRUCTION



Design and Engineering

SNAM PROGETTI SAN DONATO MILANESE, ITALY

Consulting, Engineering, General Contractor for Petroleum Refineries, Petrochemical Plants, Thermo-Electric Power Stations, Oil and Gas Pipelines, Cathodic Protection, Telemetering, Civil Works

Equipment

NUOVO PIGNONE VIA PANCIATICHI 97, FLORENCE, ITALY

Complete Plants for Oil Refineries and Chemical and Petrochemical Industries, Reciprocating and Centrifugal Compressors, Gas-Driven Engines and Engine-Compressor Units, Centrifugal Pumps, Complete Drilling Equipment, Cylindrical and Spherical Tanks, Complete Roadside Filling Stations

Pipeline Construction and Drilling Operations

SAIPEM SAN DONATO MILANESE, ITALY

Erection of Refining Plants, Petrochemical and Industrial Plants, Nuclear Power Stations; Construction of Gas, Oil and Water Pipelines; Land and Offshore Oil Drilling Operations

WITH E.N.I. GROUP COMPANIES

In part, this arrangement illustrates the effect 20% royalty has on development. British Petroleum Co. recently gave up production in Sicily at Vittoria because of it. Several small producers, including Agip Mineraria (an ENI affiliate) recently gave up entirely in Polesine. ENI is not supposed to receive special benefits, and these exemptions may force reduction of the law's 20% royalty.

Natural Gas: The Ferrandina-Grottole gas field produces from Cretaceous limestone and from Pliocene-Quaternary sand lenses from 2,000 ft to 2,800 ft of depth. Reserves were estimated at 300 billion cubic feet. Following completion of the Ferrandina find and of extensions at Grottole, a new field was found under similar geological conditions in 1959 at Pomarico, 6¼ miles southeast of Ferrandina.

The San Salvo gas field was discovered six miles inland from the Adriatic coast at the south edge of the Abruzzo region. Production is from the Pliocene from 3,000 ft to 4,800 ft. Six gas wells had been completed at San Salvo by early 1960.

Petrosud (Montecatini interests) developed in 1959 the Cellino gas field, a 1958 discovery located 19 miles northwest of Pescara. About eight gas producers were completed, proving about 30 billion cubic feet of reserves. Farther north, along the Adriatic coast, the Metauro Co. found a small gas field at Fano 1, nine miles south of Pesaro, in Pliocene sands at 1,800 ft.

PRODUCTION: Total crude and natural-gasoline production for all of Italy (Sicily included) for 1960 is estimated at two million metric tons, and 6,350 billion cubic meters of natural gas. Of these amounts, Gulf's Ragusa field (Sicily) accounted for 1,400,000 tons of crude, and ENI's Gela and Cortemaggiore fields for 650,000 tons of crude and natural gasoline. During the first 10 months of 1960, total crude and natural-gasoline production was 1,661,000 metric tons (1,613,000 crude, 48,000 natural gasoline); and natural-gas output amounted to 5.218 billion cubic meters. ENI's contribution to the 10 months' total was crude and gasoline, 557,000 tons; natural gas, 4.974 billion cubic meters.

Crude production in Italy in 1959 (exclusive of Sicily) averaged 1,801 b/d, 369 b/d more than the 1958 daily average of 1,432 bbl. Production is from Cortemaggiore, Tramutola, Vallecupa, and Cigno fields. Condensate production amounted to 497,701 bbl, an average of 1,364 b/d, down 7.7% from 1958.

Natural-gas production from the Po valley fields in 1959 amounted to 216,012 mmcf, an average of 592 mmcf daily, up 20% from 1958.

Drilling: Estimate of total exploratory drilling during 1960 in all of Italy (Sicily included), by both government and private companies, was 400,000 meters (360,000 meters in the first nine months). Agip Mineraria completed 133 wells in all of Italy (75 development and 58 exploratory).

166 tests were completed in 1959, aggregating 803,918 ft of hole in peninsula Italy, compared with 121 completions and 637,990 ft in 1958. In 1958, there were 96 completions and 512,556 ft of hole cut in the Po valley. In 1959, there were only 66 completions and 327,341 ft of hole.

Reserves: Only ENI has oil production worth noting on the mainland of Italy. ENI stated on October 24, 1960, that "only small amounts of oil have been so far found, some of it produced together with gas. This makes it difficult to appraise the size of reserves which, in any case, because of the small quantities involved, would not be very significant."

A guestimate from industry sources places crude reserves for all of Italy (Sicily included) at 45 million to 50 million metric tons. The same sources place natural-gas reserves for both peninsula Italy and Sicily at 80 billion to 90 billion cubic meters.

TRANSPORTATION: Italy has the largest natural-gas pipeline network in Europe, but little in the way of crude pipelines. However, during 1960, a project for an Italy-Germany crude line got under way through ENI, and is reported to be under construction in its first stages at present.

REFINING: Total refining capacity is about 780,500 b/d. Present capacity is in almost full use, including a 30% reserve required by law. The Italian government authorized in 1960 the addition of 136,000 b/d of capacity to existing plants.

Stanic, a joint affiliate of Jersey Standard and Italy's State-owned ENI, will add 42,000 b/d to its Bari plant to raise operable capacity to 70,000 b/d. SAROM will add 30,000 b/d for a total of 50,000 b/d at Ravenna. Shell's plant at Milan will be boosted 10,000 b/d to 38,000 b/d. The Milan plant owned by Cie. Française des Pétroles will more than double, to 18,000 b/d, by addition of 9,500 b/d. The British Petroleum-ENI Marghera refinery will add 6,300 b/d for a total of 34,000 b/d. Garrone, an independent, will add 3,000 b/d at Genoa for a total of 30,000 b/d; and Petrofina's small Milan plant will be boosted by 2,800 b/d to 4,400 b/d.

In July 1960, it was announced that ENI would build a $64 million petrochemical complex at Ferrandina in southern Italy. The State-owned company will supply the plant with natural gas from discoveries in the immediate area. ENI also has two other petrochemical plants in operation in Italy.

Union Carbide's Italian affiliate, Spa Celene, is doubling polyethylene capacity at its Priolo, Sicily, plant to 60 million pounds per year from 30 million. Celene, owned jointly by Carbide and by Societa Edison of Milan, will also begin production of ethanol, butanol, 2-ethyl hexanol, and ethanolamines.

Construction of three new plants for the production of carbon black in Italy has been projected by four American firms: Godfrey L. Cabot Inc., of Boston; Columbian Carbon Co. and Continental Carbon Co., of New York:

ITALY—Refinery Production
(Thousands of Metric Tons)

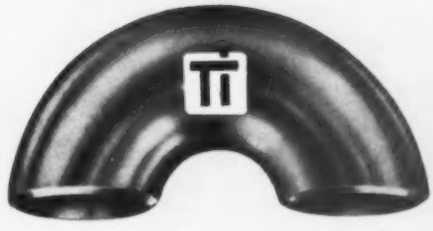
	1959	First 9 Mos. 1960	1960 (Estimate)
Motor Gasoline	3,718	3,307	4,420
Jet Fuel	581	462	615
Kerosine	446	383	520
Gas oil	5,181	4,480	6,000
Fuel oil	13,045	11,084	15,800
Lubes	162	130	175
Bitumen	624	562	750
LP Gas	556	470	750
Others, refinery consumption and losses	1,997	1,922	2,500
Total	26,318	22,740	31,530

ITALY—Refineries
(As of October 31, 1960)
Capacity in Metric Tons Per Year

Company	Location	1	2	3	4	5
Agip	Cortemaggiore	100,000	130,000	130,000	130,000	—
Api	Falconara	1,000,000	1,300,000	1,560,000	2,300,000	740,000
Aquila	Trieste	900,000	1,170,000	1,500,000	2,300,000	800,000
Condor	Rho	1,400,000	1,820,000	2,000,000	2,500,000	500,000
Delle Piane	Genoa	60,000	78,000	78,000	78,000	—
DICA	Avenza	350,000	455,000	455,000	900,000	445,000
Esso Ital.	Trieste	250,000	325,000	325,000	1,000,000	675,000
Garrone	Genoa	1,150,000	1,495,000	1,495,000	2,300,000	805,000
Getty Oil Italiana	Gaeta	300,000	390,000	1,300,000	1,300,000	—
ICIP	Mantua	425,000	552,500	552,500	900,000	347,500
ILSEA	Valmadrera	90,000	117,000	117,000	300,000	183,000
INPET	La Spezia	1,540,000	2,000,000	2,000,000	2,100,000	100,000
IPLOM	Genoa	160,000	208,000	208,000	600,000	392,000
Italia	Cremona	400,000	520,000	1,300,000	1,300,000	—
IROM	Marghera (Venice)	1,385,000	1,800,000	1,800,000	3,500,000	1,700,000
Lombarda Petroli	Monza	200,000	260,000	260,000	490,000	230,000
Mobil Oil Italiana	Napoli	2,800,000	3,640,000	3,640,000	4,500,000	860,000
Nilo	Milan	165,000	214,500	500,000	500,000	—
Petroli d'Italia	Fiorenzuola	160,000	208,000	208,000	208,000	—
Purfina	Genoa	470,000	611,000	630,000	630,000	—
Purfina	Milan	220,000	286,000	286,000	475,000	189,000
Purfina	Rome	390,000	507,000	580,000	580,000	—
RA. SI. O. M.	Augusta	4,000,000	5,200,000	5,200,000	8,000,000	2,800,000
ROL	Viguzzolo	50,000	65,000	65,000	250,000	185,000
Sanquirico	Genoa	150,000	195,000	221,000	700,000	479,000
SAROM	Ravenna	1,000,000	1,300,000	2,500,000	5,000,000	2,500,000
SARPOM	Trecate	1,000,000	1,300,000	1,300,000	1,500,000	200,000
SIROM	Cologno Monzese	52,000	67,600	67,600	67,600	—
SPI	Fornovo Taro	80,000	104,000	104,000	500,000	396,000
STANIC	Bari	1,400,000	1,820,000	2,460,000	3,500,000	1,040,000
STANIC	Leghorn	1,500,000	1,950,000	2,600,000	3,000,000	400,000
STOI	Florence	350,000	455,000	800,000	800,000	—
Volpato*	Milan	70,000	91,000	91,000	1,000,000	909,000
	Total	23,567,000	30,634,000	36,333,100	53,208,600	16,875,500

(1) Authorized capacity by concession decrees granted by Ministry of Industry and Commerce. (2) Authorized capacity plus 30% of reserve required by law. (3) Actual capacity proved by official test. (4) Actual capacity plus the expansion envisaged in the application submitted to the Ministry of Industry. (5) Net increase resulting from the applications.
*To be transferred at Talamone, near Orbetello (Tuscany).

For the finest in SEAMLESS WELDING FITTINGS



...for the
CHEMICAL
and
PETROLEUM
INDUSTRIES

TECNITUB ITALIANA, S.p.A.
of Milano Italy
Via Benigno Crespi 70 — Tel. 603 022-603 039

and Phillips Petroleum Co., of Bartlesville, Okla.

Associazione Refinerie Petrolifere indipendenti (Independent Oil Refiners' Assn.) was formed in Rome in 1960. Members are Italian refining companies without indigenous crude sources and not affiliated with international oil companies. Because of the keen competition which has prevailed from the State-owned ENI and from Italian subsidiaries of the major companies, ARPI includes among independents all smaller but complete refineries. The following are ARPI members: DICA (143,000 tons per year); Volpato (70,000); ILSEA (90,000); IPLOM (160,000); Lombarda Petroli (200,000); Nuova Raffineria Nilo (514,500); Societa Petrolifera Italiana (260,000); Sanquirico (220,000 tons per year). Their combined capacity amounts to 1,667,000 tons per year (33,340 b/d), but members plan expansion of their existing plants.

MARKETING: Figures by the Comité Professionnel du Pétrole show the United Kingdom still ranking first among OEEC consumers —France losing her second place to Germany, and Italy still ranking fourth. The same order is maintained in per capita consumption in these four countries: 760 kg in the United Kingdom; 510 in West Germany; 485 in France; and 330 in Italy (first six months of 1960).

Cities Service announced in April 1960 the acquisition of a one-third stock interest in a large independent petroleum marketer in Italy, ABC-Petrolifera Italiana SPA. This will provide Cities Service with an important outlet for its petroleum products in one of Europe's fastest growing markets. The Cities Service acquisition was through a wholly owned subsidiary, Peruvian Pacific Petroleum Co., along with a Swiss financing company, Finpet.

Amoco (Standard of Indiana) is reported to have offered in 1960 to purchase for 9.75 million lire, the combined facilities of the Camangi group, whose parent company is Italia SpA. Through Italia, Camangi owns at industrial Cremona a 1.3-million-ton refinery which includes two topping units, a catalytic desulfurizer, a catalytic reformer, a thermal reformer, an LPGas recovery plant, a fractionator, a polymerizer, and a gas-oil desulfurizer, as well as auxiliary power facilities and crude and product storage with a capacity of 444,290 cubic meters. Another company in the group owns a network of 830 service stations in central and northern Italy, currently under nine-year lease to Purifina Italiana. The Camangi group has been in financial difficulty for some time.

The Italian agency Ufficio Petroli & Unione Petrolifera has estimated oil consumption in Italy for the full year 1960 at 18,536,900 tons, or about 370,738 b/d calculated on the basis of available figures and estimates for the first six months for the major products, and for the first five months for the minor products.

Prices: Effective May 22, 1960, the price of regular gasoline was reduced to 60.5 cents and premium gasoline to 66.5 cents per U S gallon. The tax is now approximately 44.1 cents per gallon. Representative prices for gasoline in 1959 were 75.6 cent for regular and 81.6 for premium.

Russian Oil Imports: Italy is already the free world's leading importer of Soviet oil, and during 1961 the proportion increased. The government's company, ENI, signed in 1960 an agreement which calls for about 12 million metric tons of Russian oil during the 1961-64 period (about 100,000 b/d) in exchange for 240,000 tons of steel tubing and 50,000 tons of synthetic rubber. The f.o.b. Black Sea price works out to about $1.00 per barrel. This is considerably below price quotations in the Middle East. Of the 100,000 b/d total, ENI will receive 56,000 b/d over a five-year period. The remainder of about 44,000 b/d will be delivered to independent Italian refiners who, in 1960, were using about 15,000 b/d of Soviet oil already.

OIL LAWS

For a review of the Italian mainland's law, refer to WORLD PETROLEUM REPORT 1958.

For a detailed and highly recommended study of petroleum-industry legislation and regulation within Italy, the editor highly recommends *Petroleum Legislation*. This is a legislative reference service containing a summary and analysis of the oil laws and other industry regulation for every major country of the world. The national sections are prepared by legal counsel recommended by oil companies who have actually operated within the country concerned. The same oil-law firms keep their reviews up-to-date by loose-leaf revision service. For information on this excellent service, the publisher may be contacted directly at: *Petroleum Legislation Ltd., P. O. Box 1591, Grand Central Station, New York 17, N. Y.*

The Chamber of Deputies approved in 1960 a bill amending the present law on exploration, and envisaging the granting of exemptions from royalties to concessions unable to achieve commercial production levels. The amendment establishes that the holder of an exploitation concession may be exempted from turning over to the State the required share of his production of a given calendar year, provided the average daily production of his wells, measured over that year, is not in excess of two tons, and provided also the overall daily production average of the whole concession, measured over the same calendar year, and divided by the number of productive wells, is not in excess of one ton.

Trentino-Alto Adige Law Summary

The basic petroleum law of Trentino-Alto Adige is more attractive for oil prespecting than the national law of Italy, which does not cover this semi-autonomous territory.

Exploration: Exploration permits may be up to 50,000 hectares, but no one person may hold more than 150,000 hectares. They run for three years, but may be extended for two successive periods of two years each. A fee of 200 lire per hectare per year is required, and this rate rises to 400 lire for the first two-year extension and to 600 lire for the second extension. The decree granting the permit shall specify the particular obligations required of the permit holder.

Exploitation: The permit holder has the right to convert to a concession if he has found oil or gas. A concession is for 20 to 30 years, and may be extended for successive periods of up to 15 years.

Exploitation fee is 1,500 lire a year for each hectare in the concession area. Annual royalty, in kind or cash or part of each, ranges from 2.5% of the entire production up to four tons per well per day. Natural gas pays the same royalty, assuming one ton of oil the equivalent of 1,200 cubic meters of gas.

Refinery Ruling: The Italian Constitutional Court has ruled that refinery projects in Sicily require the consent of the Italian government, and that the Sicilian regional government is not authorized to grant permits.

A new Sardinian code has been set up. Prospecting permits, to be given only to Italian nationals or companies registered in Italy, are valid for three years and can be twice extended, each time for three years. Concessions are for 20 years, and can be renewed three times for 10 years on each occasion. Normally, the maximum size of a permit is 250,000 acres, and of a concession 12,500 acres, with the further provision that the total to be held by one permit holder and by one concessionaire must not exceed 375,000 acres and 200,000 acres, respectively; but the areas are doubled if the permits or concessions are held by an entity in which either the Italian State or the Sardinian region has an interest of at least 30%. There is a graduated scale of royalties, ranging from 1% on the first 750 bbl of crude produced in a month, to 25% in excess of 30,000 bbl a month.

An exploration permit covering the western half of Sardinia is held by a company in which the regional government participates together with the German company Wintershall.

NATIONAL FACTORS

A detailed study of taxation of petroleum in Italy has been prepared, and will be available during early 1961 under the title of "*International Taxation Series.*" This series is devoted exclusively to petroleum taxation, covering every type of tax imposed on petroleum operations in all countries. Marketing, refining, transportation, exploitation, and production taxes are covered, with a separate study of each. For an example of one of these national studies (all are prepared in exactly the same format), readers are referred to the Colombia section of this issue of WORLD PETROLEUM REPORT, i.e., the section entitled "Colombia—Petroleum Industry Taxation." Requests for information should be addressed to "*International Taxation Series,*" *P. O. Box 2744, Grand Central Station, New York 17, N. Y.*

ITALY—Crude-oil Imports
(Thousands of Metric Tons)

From:	1959	1960 (1st 9 months)
Saudi Arabia	5.512	3.954
Egypt	1.121	165
Iran	1.507	993
Iraq	5.586	6.089
Qatar	269	492
Kuwait	7.952	6.722
USSR	2.280	2.828
Venezuela	577	389
Others	80	15

ITALY—Oil Exports
(Thousands of Metric Tons)

	1959	1960 (1st 9 Months)
Domestic crude	450	590
Gasoline	1.523	1.382
Jet Fuel	441	300
Kerosine	229	193
Gas oil	2.227	2.030
Fuel oil	3.086	1.925
Lubes	16	16
Bitumen	117	101
LP Gas	10	9
Others	15	11
Total	8.114	6.557

Note: Bunkers delivered to foreign ships and aircraft in the first nine months of 1960 included 1.542.195 tons of gasoline; 306.853 kerosine; 1.193.908 gas oil, and 2.720.969 tons of fuel oil.

Portable Power

PORTABLE POWER does not tie up boats when motors are being serviced. Motors can be stored out of the weather.

It makes work more profitable through economy, dependability and low maintenance

Portable power provides mobility for men and materials. It saves money, time and labor. When it bears the stamp of Outboard Marine, it can be depended upon for years of efficient service.

There is a world of work in Outboard Marine products. Outboard motors move fish to market, lumber to mills, coffee to roasters... chain saws speed woodcutting and construction... lightweight hauling vehicles cut the cost of deliveries... power mowers groom the lawns of homes and business.

There is better business for you in Outboard Marine products, whether you use them or sell them. For full information about the products or about exclusive dealerships now available, write to: Outboard Marine International, S.A., Dept. A18-2, P.O. Box 830, Nassau, Bahamas.

OUTBOARD MARINE INTERNATIONAL S.A.

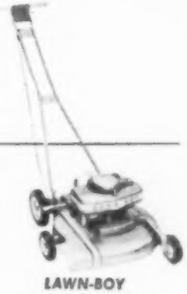
EVINRUDE, the quiet outboard motor. 8 models, 3 to 75 HP.

JOHNSON outboard motors, famed for dependability. 8 models, 3 to 75 HP.

PIONEER CHAIN SAW. Powerful, lightweight, best balanced, easiest to handle.

CUSHMAN TRUCKSTER. Economical, low maintenance, light hauling vehicles. Many body styles.

GALE outboard motors. 8 powerful new models, 3 to 60 HP.



LAWN-BOY power mowers. For every lawn and every budget.

Italcementi's production embraces all API type oil well cements

Oil well cements are produced in the North

Since the beginning of the exploration projects of the metano and oil deposits in the Po Valley, i.e. since the first years after World War II, Italcementi made all efforts to complete its extensive range of products with that of cements idoneous for deep oil well cementing operations. Thus approximately 12 years ago the Vittorio Veneto Plant began the production of Geocem: *cement for the soil.*

It was the sulphate resistant type, whose composition was based on a very low alumina content and the total absence of tricalcium aluminate substituted by the ferric phase having solid solutions the composition of which lies between $6CaO.2Al_2O_3.Fe_2O_3$ and $2CaO.Fe_2O$.

This type of clinker belongs to the ferric clinker family which, in 1926, the Italcementi produced for the first time on an industrial scale, and successively applied for a patent which claimed the particular field of composition characteristic for these cements.

For the production of "sulphate resistant Geocem" the twenty years of experience gained, during the production on an industrial scale, both in the constitutive and productive knowledge of the special clinker, was usefully utilized and it was possible to readily grade the rate of hydration and set of the product according to the temperature to which it is submitted. Ideal conditions were, therefore, created for an oil well cement.

Three types of Geocem cements were established and graded according to the maximum depth of their use.

Geocem type I—maximum depth 9,000′
Geocem type II—maximum depth 14,000′
Geocem type III—maximum depth 16,000′

The presence at the same plant of the particularly idoneous and constant quarry materials and of the up-to-date wet process installations closely checked by severe chemical controls guarantees the perfect conformity with the desired chemical parameters of the products which are essential to maintain the constant properties relative to the physical performance (pumpability, sedimentation, mechanical strength) and chemical resistance.

In the drilling of wells for the exploitation of the endogenous force of boraciferous deposits in central Italy (Larderello), this cement met severe conditions of use. Under these conditions, although great depths are not reached, high temperatures are met due to the presence of superheated steam, whilst from the chemical point of view there are difficulties due to the presence of boric waters, containing sulphur and ammoniac compounds.

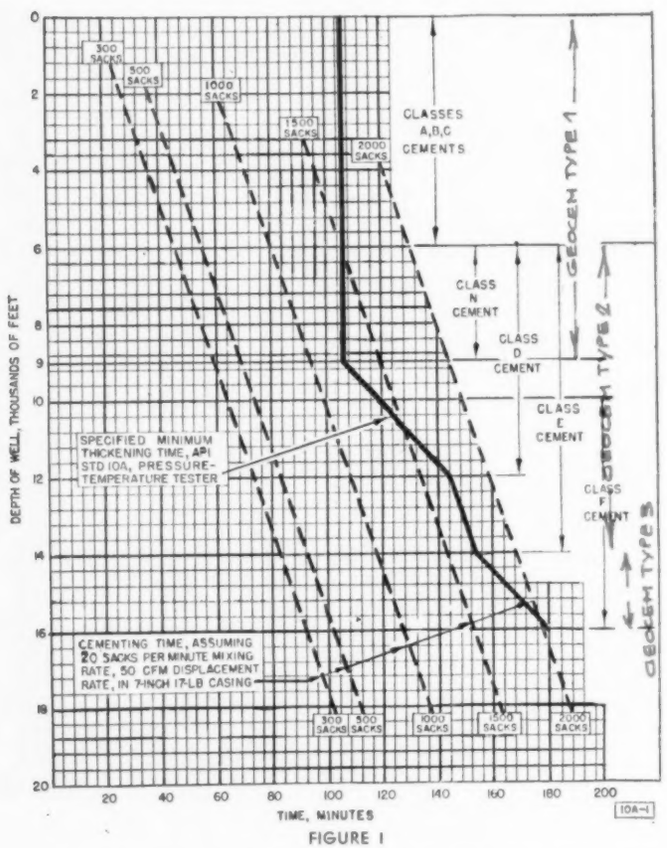


FIGURE 1

WELL DEPTHS AND CEMENTING TIME RELATIONSHIPS

WITH REFERENCE TO GEOCEM PRODUCTS the chart shows the total cementing times for various quantities of cement, under the conditions as stated: also the thickening-time requirements. This information is given herein for the guidance of the user in selecting the cement best suited to a particular job, giving due consideration to the well conditions and the estimated cementing time.

The production is extended to the South

Since approximately 10 years the exploration operations for oil, started in Sicily, soon reached a high volume; and here once again the Italcementi, with its well distributed productive organization throughout Italy, is rapidly preparing herself to produce cements to be used in oil wells near the new fields of exploitation. Thus in 1955 also the Catania Plant of the Consociate "Cementi Portland S.p.A." started to produce the three above mentioned types of Geocem cements. While the Vittorio Veneto Plant specialized in producing the "sulphate resistant", the Catania Plant produces the normal type. Therefore the chemical-mineralogical composition is consequently different, but the physical characteristics are practically corresponding, thanks to the well studied chemical parameters and rational use of retarders.

The products of the two plants cover in fact the various A P I prescribed types of cements as seen in figure 1.

On the basis of these characteristics, ascertained through the number of years of practical applications, the American Petroleum Institute has recently granted to Italcementi the right to use, for its products, the official monogram of the American Petroleum Institute which is a guarantee that the product corresponds to the most severe requirements of the technique of cementation.

Export possibilities—Since the countries of North Africa and of the Near East up to the borders of Pakistan have become the largest producers of crude oil in the world it is evident that Italy, due to its geographical position, is particularly favored both for the import of "crude oil" and export of cement and other equipment necessary for the oil well drilling operations. This advantageous condition was exploited by the Italcementi which equipped herself to load in the various suitably located ports so as to be able to trade within the Mediterranean basin, the Red Sea and the Persian Gulf area.

The product of the Vittorio Veneto Plant is directed to the Ports of Venice and Trieste. The Catania Plant is connected with the well equipped port of this city.

Also the Albino Plant (near Milan) which can load in Genoa and the Senigallia Plant which is near the port of Ancona have been equipped for the production of Geocem type 1. The location of the Geocem producing plants and of the ports are shown in figure 2. The same also shows the plants belonging to the Italcementi group.

This gives a precise idea of the distribution of the Italcementi products to every region of the country and the favorable export possibilities of all its products towards the Orient with which the import-export trade will be increasing and most of this activity is inevitably associated with the oil Industry and the materials connected with it.

Advertisement

GEOCEM

ORIGINAL

No. 9171

American Petroleum Institute

Certificate of Authority To Use Official Monogram

THE AMERICAN PETROLEUM INSTITUTE hereby grants to

"ITALCEMENTI" FABBRICHE RIUNITE CEMENTO

Bergamo, Italy

the right to use the official monogram API on Oil-well cements

under the conditions specified in the official publication of the American Petroleum Institute entitled API Std 10A: Specification for Oil-Well Cements and Cement Additives

with the understanding that the use of this monogram shall constitute a representation that the material so marked complies with the latest edition of said specification, and with the further understanding, that material which fails to comply will not be so marked.

The American Petroleum Institute reserves the right to revoke this authorization to use the official monogram, for any reason satisfactory to the Board of Directors of the American Petroleum Institute.

New York, June 8, 1960.

AMERICAN PETROLEUM INSTITUTE

Secretary.

CEMENTAZIONI A GRANDI PROFONDITÀ

GEOCEM

- OIL WELL CEMENTS -
- ITALCEMENTI - BERGAMO - ITALY -

- ● PLANS PRODUCING PORTLAND, BLAST FURNACE FERRIC, WHITE CEMENTS.
- ◉ PLANTS WITH NORMAL PRODUCTION OF GEOCEM TYPE 1-2-3 (A.P.I. CLASSES A,B,C,D,E,F,N).
- ◐ PLANTS PRODUCING UPON NOTICE GEOCEM TYPE 1 (A.P.I. CLASSES A,B,C)
- ■ LOADING PORTS.

FIGURE 2

USA private investment in Italy—now nearly $300 million—is growing at a faster rate than in other Common Market countries. Almost half the $173 million in foreign private capital invested in Italy during 1958 came from the USA. Here's where the dollars have gone:

Petroleum	50%
Chemicals and pharmaceuticals	25%
Food processing	5%
Light-metal goods	10%
Other manufacturing	10%

Taxation: Oil taxation is one of the largest sources of government revenues in Italy. Apart from corporate income taxes paid by companies operating in the refining, transportation, and marketing businesses, much of Italy's revenues from petroleum stems from the "manufacturing tax" and the "IGE" tax an excise and a transaction tax, respectively. Apart from their administrative and fiscal characteristics, their common and most important feature is that they are paid at the time in which the product (if manufactured in Italy) leaves the refinery. Imported finished products pay both taxes when crossing the Italian border. In this case the manufacturing tax acquires the name of "border tax"—without, however, replacing custom duties in any way. In all cases, however, the Italian treasury collects ready cash, whereas the refining and marketing companies operating on the Italian market must advance this money, awaiting to recover it through their retail sales.

In the Italian 1960-61 budget, these two taxes should yield a combined revenue of about one-seventh of total regular revenues budgeted for 1960-61 (3,530,000 million lire).

Tax rates are fixed by law. The general transaction tax (IGE) is levied as a percentage of the value of the commodity taxed, whereas the manufacturing tax is in the form of a fixed amount per metric quintal. For many commodities, the IGE tax applies to each successive sale (cascade tax). For some commodity groups (among them petroleum products) the tax is levied only once, in accordance with the so called "una tantum" principle. The percentage applying to petroleum products are 7.7% for motor fuels and 4% for other fuels.

Effective on August 15, 1960, the manufacturing tax on heavy fuel was reduced to 2.500 lire per ton from 3.100 lire, with a consequent reduction of the retail price to 13.200 lire from 14.700 lire. The tax burden thus declined to 18.94% from 21.09%. The IGE tax was maintained at current 4% rate. The overall tax burden is, therefore, 22.94% of the retail price.

The manufacturing tax for fluid and extra fluid fuel is 3.200 lire and 3.700 lire per ton, respectively. END

SPAIN

EXPLORATION: Since passage of the new petroleum law in 1958, exploration has accelerated, although held back by slow governmental action on oil grants. For a background on exploration, previous issues of World Petroleum Report should be consulted. They show a considerable amount of drilling, but no oil or gas discoveries so far. Several companies, including Valdebro, INL, Adaro, Capsa and Cia. Petrolera Iberica, drilled during 1960, using a total of 11 rigs. These and other exploring companies are shown on the accompanying map. Their operations have been held up by lack of final approval of concessions which was not forthcoming until August 1960.

For operations in the Spanish Sahara, see that section in the Africa division of this report.

PRODUCTION, REFINING, MARKETING: There is no production in Spain of crude oil. One large (80,000 b/d) refinery exists in the country, at Escombreras, near Cartagena. It is owned by REPSA (Refineria de Petroleos de Escombreras) owned 24% by Caltex Products Co., 52% by the government's INI and 24% by CEPSA. There are several shale oil plants in the country, as described in detail in World Petroleum Report 1958, page 207.

Ohio Oil Co. applied in 1960 for permission to build a 25,000 b/d refinery near Bilbao. While Ohio would pay 80% of the $18 million cost, it would only have 28% ownership and will receive dividends from its ownership in pesetas, not in dollars. The government will own 52%. Spanish partners and banks will own the remaining 20%. Hooked to the offer is a 10-year crude supply contract for Ohio which will help that company dispose of its Libyan reserves. Unconfirmed reports bring out a very low price quotation by Ohio of $1.78 per barrel in Spain. Deducting transportation costs, this would mean about $1.50 posted price quote in Libya.

Ohio explains it is interested in this refinery only as an outlet for its Libyan reserves. The Spanish market, now about 112,000 b/d (crude equivalent), is growing very rapidly due to internal industrialization. Distribution in it is a monopoly (except for some specialized product sales) of CAMPSA (Cia. Arrendararia del Monopolio de Petroleos, S. A.), a government-sponsor-(controlled) company with Spanish private capital, to which Ohio would sell.

A bid to build a 24,000 b/d refinery at Vigo with 60% foreign capital was turned down by the government. It was filed by Petroleos de Galicia, headed by former Navy Minister Salvador Moreno Fernandez.

An initial application for petrochemical construction was turned down by the Spanish government, but Standard Oil Company (New Jersey) joined Compania Espanola de Petroleo, S. A. in appealing to the government to reconsider the Jersey Standard-Cepsa proposal to build three petrochemical plants in northern Spain. The joint application for necessary government permission was submitted to the minister in May, 1960 and denied on September 2. If the appeal is successful, Jersey Standard-Cepsa will form a partnership to produce and market more than 24,000 tons of petrochemicals per year. Included would be raw materials for detergents, plastics and rubber for Spanish industry.

COMPANIES DRILLING IN SPAIN

Company	Rig Type	Depth Capacity (meters)
Campsa	Oilwell	2,200–2,500
Valdebro	Emsco J	1,100–4,500
	Emsco G	3,000–3,500
Ini	Emsco J	1,100–4,500
Adaro	Haniel-Lueg	1,500–1,800
Cepsa	Emsco	3,000–3,500
	Wirth	4,000–4,500
	National Ideal	110–5,000
Cia. Petr.	Salzgitter SB-30	500
Iberica	Failing 2,500	800
	Salzgitter 200/g	2,000

Source: International Rig Report, Post Office Box 2732, Grand Central Station, New York 17, New York.

Dow Chemical Co.'s Spanish affiliate, Dow Unquinesa, received Spanish government approval for construction of a petro-chemical complex to be in operation by 1963 at Bilbao. This group of plants is slated initially to produce ethylene, propylene, polyethylene, and polypropylene plastics. Products, new for the country, are destined chiefly for Spanish consumption.

COMPAÑIA PETROLIFERA IBERICA

Drilling Sequence	Name of Well	Coordinates	Year Drilled	Total Depth (Meters)	Results: g: gas l: liquid hydrocarbons s: asphalt
29''	Elvira 1	0° 42' 11" E. 42° 57' 39" N.	1956	141	Strat.
29''	Elvira 2 a	0° 42' 02" E. 42° 58' 03" N.	1956	172	Strat. (g)
32'	Elvira 3	0° 42' 04" E. 42° 58' 07" N.	1956	272	Strat. (g)
32''	Elvira 4 a	0° 41' 59" E. 42° 58' 14" N.	1956	340	Strat. Shows (g)
33'	Elvira 2 b	0° 42' 12" E. 42° 58' 02" N.	1957	309	Strat. (g)
33''	Elvira 4 b	0° 41' 50" E. 42° 56' 15" N.	1957	506	Strat.
34'	Encarnacion 1	0° 20' 17" E. 43° 04' 20" N.	1957	439	Strat. Shows (g, l)
51'	Aloria 1	0° 42' 22" E. 42° 59' 35" N.	1958–59	841	Strat.
51''	Sopeñano 1	0° 21' 11" E. 42° 04' 43" N.	1959	510	Dry
56'	Elvira 5	0° 41' 46" E. 42° 58' 18" N.	1959	648	Strat.
57'	Sopeñano	0° 20' 53" E. 43° 04' 38" N.	1959	405	Dry
59'	Lahoz 1	0° 26' 57" E. 42° 52' 58" N.	1959	701	Strat.
61'	Sopeñano 3	0° 20' 50" E. 43° 04' 37" N.	1959	1,913	Dry
62'	Tabliega 1	0° 14' 12" E. 43° 00' 28" N.	1959	482	Strat.
64'	Sopeñano 4	Near other Sopeñanos Wells	1960	1,310	Shows

NOW! Amazing SERVCOLOY "S" tungsten carbide tool dressing for sale in 18" bars ... *for application by your personnel to any make or type tool*

When first introduced six years ago, SERVCOLOY "S" completely revolutionized downhole milling and washing over operations. Cutting rates possible with this amazingly efficient tungsten carbide dressing material make most fishing operations a certain success. Rates as high as 10′ per hour are not at all uncommon when milling stuck wash pipe or casing. Even rock bits and cones, reamer-stabilizer blades, hard-faced tool joints—the toughest materials used in drilling—are milled with relative ease.

Until recently, SERVCOLOY "S" was used only on SERVCO tools. Now you can buy it by the pound in 18" bars, for application by your personnel on any type wash-over shoe, mill, etc.

APPLIED IN SHOP OR FIELD—Application is accomplished with an oxy-acetylene torch. Easy-to-follow instructions are supplied with each order to assure successful application. Get a supply of SERVCOLOY "S" today and use it on your next job. SERVCO's field representative will be happy to work with you to assure maximum performance.

DON'T BE MISLED BY IMITATIONS Numerous attempts have been made to copy SERVCOLOY "S." Some of these imitations are now on the market, claiming to possess the same properties and give the same results. *But there is only one SERVCOLOY "S."* It is a unique product. Its superior performance in the field has been proved by more than 4000 jobs.

ORDERING INFORMATION

FOR WASH-OVER SHOES:
SERVCOLOY "S", 1/8" x 3/16" or 3/16" x 1/4" size.

FOR MILLING TOOLS:
SERVCOLOY "S", 1/4" x 5/16" size.

For every 25 lbs. of SERVCOLOY "S", order 15 lbs. of special overlay rod and 1 lb. of special flux. For speedy grinding, SERVCO's special wheels are available.

SERVCO
...the modern drilling tools

General Offices: 2440 Cerritos Ave., Long Beach 6, California
Canada: 6909 104th St., Edmonton, Alberta • **Venezuela:** Apartado 198, Maracaibo
France: 106 rue Lauriston, Paris 16 • **Trinidad:** P.O. Box 104, San Fernando
Mid-East: Macridge Petroleum Equipment-Supply Co., S.A.L. Beirut, Lebanon

Field Offices: Ventura, Bakersfield, Lafayette, Harvey, Casper, Oklahoma City, Houston, Odessa, Denver, Farmington, Williston, Carmi

*U.S. PATENT NO. 2,811,439

Du Pont's world-wide contribution —from seismic

Loading NITRAMON* S in the desert. NITRAMON S and its primers are packed in threaded metal cans that are virtually weatherproof. Charges are easily assembled and so rigid that they can often be loaded when gelatin dynamite can not.

IN EXPLORATION

NITRAMON* S—safest blasting agent known. Cannot be detonated by flame, sudden shock, ordinary blasting caps or even a .30 calibre rifle bullet. Yet it is readily detonated with NITRAMON Primer. Packed in rigid, watertight metal containers. Ideal for "sleeper" holes.

NITRAMON* WW—has properties similar to NITRAMON S, but is designed for offshore work. Watertight metal cans offer maximum storage and weather protection and fire resistance. Cans sink rapidly, but are easily buoyed up when necessary.

SEISMOGRAPH 60% HI-VELOCITY* GELATIN—withstands high water pressures, long immersion and adverse storage conditions. Supplied with Du Pont Fast-Coupler cartridges that speed up assembling charges of any length.

SEISMEX* PW—a very economical dynamite specially designed for shallow hole pattern work.

SSS* ELECTRIC BLASTING CAPS—well known for exceptional accuracy, dependability and high static resistance, an important safety advantage.

ELCORD* DELAY UNIT—first practical, flexible, accurate means for sequential shooting and matching velocities. Better signal, less noise, no "ghosts."

DU PONT PHOTORECORDING PRODUCTS—a line that includes: rugged, fast-drying CRONAR* Recording Film and Lino-Flex 1 Recording Film; Seismo-Writ—a high-speed paper designed to give clear, stain-free seismic traces under difficult field conditions; and Lino-Writ—fast, easy-processing papers designed for use in a wide range of oscillographic equipment.

**Du Pont's trademark for its polyester photographic films.*

DU PONT

REG. U.S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

to the petroleum industry crew to selling team

Throughout the free world—wherever the lure of oil has beckoned the adventurous to dedicate themselves—there, too, will you find these dependable, long-used products of Du Pont. Backed by Du Pont research, these quality products meet exacting needs in all areas.

They serve in the fields of exploration where men seek out the hidden treasure . . . on torrid desert, snow-rimmed mountain and far at sea. They aid in drilling deep for the precious fluid and in refining it for countless uses. And, finally, they help smooth the intricate processes of selling, shipping and storing this modern source of heat and power.

Time-tested. This wide variety of dependable Du Pont products is the result of painstaking research, development and field- testing. Whether your operations are offshore, in the jungle, in the desert—anywhere in the world, in fact—you can rely on the quality and dependability of these time-tested Du Pont products.

At your service. Whatever your field of activity—exploration, drilling, refining or marketing—Du Pont Distributors are strategically located to supply your needs or provide technical assistance. For more information, just fill out and mail the coupon below.

IN DRILLING

DU PONT CMC provides good control of fluid loss and viscosity. Its action as a protective colloid guards muds against contaminating effects of salt, gyp and anhydrite formations. Because CMC has excellent resistance to chemical and bacterial degradation, it can be used in high-temperature wells.

HIGH VISCOSITY CMC—developed especially for low-solids drilling muds, builds viscosity, provides good fluid-loss control, keeps mud costs down because of the minimal amounts needed.

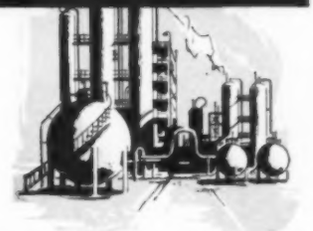
LOW VISCOSITY CMC—minimizes fluid loss in drilling muds without adding excessive viscosity. In some cases, notably sea-water muds, it is used as a thinner to reduce mud viscosities and gels. It is also used extensively in lime-treated muds to avoid high mud viscosities often caused by starch.

DU PONT PLASTICS—Because ZYTEL® nylon resins have excellent bearing properties and abrasion resistance, they are now being used, for example, to manufacture sucker rod guides. ZYTEL prevents wear between rods and tubing in lifting fluid from a pumping well. TEFLON®—TFE fluorocarbon resins have a natural slippery surface; less torque is needed to turn shafts or stems equipped with packings made of TEFLON, even under high gland pressures.

DU PONT NEOPRENE SYNTHETIC RUBBER is widely used for rubber parts on drilling tools: drill pipe protectors, casing guards, packing rings, piston rubbers and pipe strippers. Du Pont neoprene resists deterioration from heat, drilling muds, abrasion, has served for over 25 years.

DELRIN® ACETAL RESIN PIPE—a major new type of plastic pipe manufactured and sold direct by Du Pont. DELRIN pipe combines both high strength and high toughness with excellent fatigue endurance under pressure surging conditions, as well as resistance to corrosion and solvents. A simple heat fusion fastening method yields an integral joint of high strength on a 25 second cycle. Applications include flow lines, salt water disposal lines, gathering lines, and water flood lines.

IN REFINING



THE WORLD'S FIRST manufacturer of tetraethyl lead, Du Pont has served the petroleum industry for 38 years; now produces TEL, TML and Tetramix** antiknock compound, antioxidants, dyes and additives for fuel and lube oils.

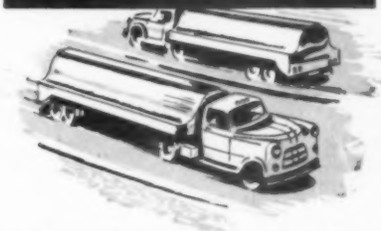
BOTH DU PONT NEOPRENE AND HYPALON† synthetic rubbers are used in various applications. HYPALON has outstanding resistance to strong oxidizing chemicals. Neoprene gives remarkable service in transmission belting, as a protective jacket for wire and cable, for valve and pipe linings, tank linings and as a protective maintenance coating.

TEFLON® RESINS have superior physical properties and withstand the most corrosive chemicals, even at elevated temperatures. For these reasons, it has gained widespread use in pipe linings, hose, gears, bearings, gaskets and packings.

WEED KILLERS—TELVAR® monuron and KARMEX® diuron kill unsightly weeds, reduce fire hazards and maintenance costs. One application does the job for a season or longer.

DU PONT DULUX® TANK WHITE ENAMEL reduces evaporation losses of costly volatile liquids in atmospheric pressure storage. This evaporation, caused by heat, is minimized by the use of durable, high-reflective DULUX Tank White.

IN MARKETING



TIME HAS PROVED the exceptional durability of neoprene hose. Whether it's dock, curb pump, fuel oil or tank truck hose, performance records are convincing evidence of neoprene's extended service life. Neoprene tube resists deterioration from oil, gasoline or chemicals. Neoprene hose cover resists sunlight and weather, withstands rough handling that chips, cuts, abrades and causes flex cracking in ordinary hose.

DU PONT LUCITE® ACRYLIC RESINS and cast acrylic sheet made from Du Pont MONOCITE†† are lightweight, durable, and have superior optical properties. These naturally lend themselves to the manufacture of signs, medallions and displays with eye-catching sales appeal for the retail outlet. *The corrosion resistance and toughness* of ZYTEL nylon resins make it ideal for bearing and valve parts in gasoline pumps. Moveover, its moldability often means fewer parts are required in an assembly, thereby improving operation and reducing costs.

ALATHON® POLYETHYLENE RESINS AND ZYTEL® NYLON RESINS are used as insulating and jacketing materials for wire and cable because of their high dielectric strength and resistance to oils and chemicals.

***Trademark*

†"Hypalon" is Du Pont's registered trademark for its synthetic rubber (Du Pont supplies only the neoprene and "Hypalon." It does not make the finished products described here. These are made by better rubber products manufacturers.)

††Trademark for DuPont's methacrylate monomer

Du Pont Products for the OIL Industry

E. I. du Pont de Nemours & Co. (Inc.)
Room 2507, Nemours Building, Wilmington 98, Delaware, U.S.A.

Please send me literature on: .....

For: .....

Name ..... Position .....

Company .....

Address .....

City ..... Country .....

WPR-61

SUMMARY OF WELLS DRILLED
(Through January, 1960, approx.)

(Wells are in chronological sequence by company. Drilling sequence numbers indicate sequence in which wells were drilled)

ADARO

Drilling Sequence	Name of Well	Coordinates	Year Drilled	Total Depth (Meters)	Results: g: gas l: liquid hydrocarbons s: asphalt
6	Chiclana	(See Chiclana 2)	1947–49	247	Shows (g, l)
14	Baeza	Near rail station at Baeza-Bailén	1953	410	Shows (g)
16–18	Baeza-Bailén		1953–54	(161)–640	Shows (g)
22'	Ecija	1° 23' 43" O. 39° 34' 45" N.	1954–55	354	(g)
22	Chiclana 2	2° 27' 38" O. 36° 24' 45" N.	1954–56	1,032	Shows
29'	Villalba del Alcor	2° 48' 15" O. 37° 29' 59" N.	1956	210	Dry
34	Medina Sidonia	2° 13' 50" O. 36° 22' 25" N.	1957	184	Dry
37'	Carmona 1	2° 0' 55" O. 37° 31' 17" N.	1957–58	792	Strat. Test
50	Carmona 2	1° 55' 40" O. 37° 31' 30" N.	1958	583	Dry
53	Castilleja de la Cuesta	2° 22' 32" O. 37° 22' 57" N.	1959	937	Shows (g)
57	Salteras 1	2° 24' 58" O. 37° 24' 58" N.	1959	665	Shows (g)
58	Carmona 3	1° 55' 58" O. 37° 28' 52" N.	1959	908	Dry
61	Carmona 4	1° 54' 42" O. 37° 26' 31" N.	1959	1,232	Dry
65	Carmona 5	1° 51' 31" O. 37° 24' 40" N.	1960	845	(g, g)

CIEPSA

Drilling Sequence	Name of Well	Coordinates	Year Drilled	Total Depth (Meters)	Results: g: gas l: liquid hydrocarbons s: asphalt
5	Oliana	4° 59' 23" E. 42° 04' 12" N.	1947–48	2,223	Dry
8	Burgo de Osma	0° 37' 05" E. 41° 34' 26" N.	1949–50	2,212	Dry
9	La Marina	3° 01' 40" E. 38° 08' 40" N.	1950–51	1,610	Dry
11	Rojales	2° 58' 18" E. 38° 04' 30" N.	1952	1,582	Dry
13	Boltaña	3° 43' 00" E. 42° 43' 00" N.	1952–54	2,124	Dry
21	Zuñiga 1	1° 23' 22" E. 42° 43' 12" N.	1954	3,102	(g)
23	Apodaca 1	0° 57' 30" E. 42° 55' 00" N.	1955	2,535	Dry
31	Alda 1	1° 21' 38" E. 42° 44' 54" N.	1956–59	5,024	Shows (g)
29	Laño 1	1° 05' 22" E. 42° 39' 37" N.	1956	3,501	Shows (g, l, s)
33	Treviño	0° 57' 20" E. 42° 43' 24" N.	1957	2,595	Shows (g)
40	Treviño 2	1° 00' 58" E. 42° 42' 28" N.	1957–58	2,000	(g)
42	Laño 2	1° 00' 00" E. 42° 39' 50" N.	1958	2,195	Shows (g)
45	Treviño 3	0° 54' 30" E. 42° 43' 20" N.	1958–59	3,134	Shows (g)
52	Alloz	1° 42' 49" E. 42° 42' 12" N.	1959	3,231	Dry
60	Urbasa	1° 25' 00" E. 42° 48' 38" N.	1959	3,400	Shows (g)
63	Castillo	1° 01' 00" E. 42° 48' 40" N.	1959	2,750	(g, g, g)
64	Zufia	1° 34' 50" E. 42° 39' 48" N.	1960		

CAMPSA

Drilling Sequence	Name of Well	Coordinates	Year Drilled	Total Depth (Meters)	Results: g: gas l: liquid hydrocarbons s: asphalt
1	Tudanca	0° 01' 14" O. 42° 51' 36" N.	1941	445	Dry
2'	Zamanzas 1	0° 02' 42" O. 42° 50' 40" N.	1942	602	Shows (g, l)
3	Zamanzas 2	0° 02' 22" O. 42° 50' 40" N.	1944	820	Shows (g, l)
4	Zamanzas 3	0° 02' 50" O. 42° 50' 40" N.	1945	860	Shows (g, l)
7	Peña Ortun	0° 04' 30" O. 22° 52' 08" N.	1949–50	1,264	Shows (g, l)
10	Dobro	0° 02' 40" E. 42° 49' 38" N.	1951	1,221	Dry
12	Villanueva de Rampalay	0° 02' 08" O. 42° 50' 25" N.	1952–53	2,177	Shows (g, l)
19	Delica	0° 42' 03" E. 42° 57' 42" N.	1953–54	558	Dry
28	Leva 1	0° 01' 55" O. 42° 56' 51" N.	1956	1,512	Shows (l)
35	Leva 2	0° 00' 42" E. 42° 57' 08" N.	1957	2,219	Dry
54	Guernica	1° 00' 55" E. 43° 19' 42" N.	1959	1,640	Dry

MARKETING: Oil marketing is a monopoly of the government under CAMPSA, as previously mentioned. It receives its supplies from CEPSA, which has a refinery in the Canary Islands, and from the shale oil plant at Puertollano. REPSA refinery supplies some.

The Spanish government is determined to maintain the monopoly, although the marketing service it renders is not efficient. CAMPSA is 70% private, owned by such interests as the Banco Espanol, the Banco Espanol de Credito, etc. The remainder is owned by the government.

OIL LAWS

The present oil code was passed on December 22, 1958. The detailed summary of it contained in this section is taken from *Petroleum Legislation*, a legislative reference service which summarizes the oil laws and concession contracts of most countries of the world, keeping them up to date by means of loose-leaf revisions. For information on this reference service, which is highly recommended, inquiries should be sent directly to the publisher, *Petroleum Legislation Ltd., Post Office Box 1591, Grand Central Station, New York 17, New York.*

NATIONAL FACTORS

For about a year and a half, Spain has been engaged in an intricate effort to stabilize its economy and support its new position as a member of the OEEC. Bold measures have been taken to check inflation, liberalize the government-directed economy, and stabilize the peseta. The first stage, put into effect with the help of the International Monetary Fund, succeeded beyond expectations. The second stage is now under way. One of its basic objectives is to curtail the privileged position of government-controlled industries and encourage private enterprise. Revision of the labor laws is under way to modernize industry and streamline production.

SPANISH SAHARA—OIL REGULATIONS

SPECIAL REGULATION ON THE APPLICATION OF THE HYDROCARBONS ACT IN THE SPANISH PROVINCES IN AFRICA. DECREE 1066, JUNE 25, 1959.

1. These regulations apply to exploration and exploitation activities in the territories of Spanish Guinea and West Africa.

2. Exploration or exploitation can be carried out only with an exploration permit or exploration concession. Surface prospecting may be done freely and no exclusive rights therefor may be granted. The authorization for surface prospection enables the holder to carry out preliminary work using geological methods but excluding the boring of holes and the use of explosives. The authorities and conditions for carrying out the prospecting shall be granted by the Dirección General de Plazas y Provincias Africanas. Such authority carries no special rights for obtaining permits and are cancelled automatically when permits are granted.

3. Separate registers for Zones II and III will be opened in the Servicio de Hidrocarburos of the Dirección General de Minas y Combustibles of the Ministry of Industry.

4. When permits, concessions and extensions of same are granted, the Dirección General de Plazas y Provincias Africanas will give orders for the estimates for rendering demarcation services to be drawn up within fifteen days and sent to the interested party so that he may pay the fee therefor within fifteen days. The services will be completed within three months from the date of payment. The Dirección General de Plazas y Provincias Africanas will issue orders for demarcation and the setting up of landmarks.

5. Copies of all documents referring to work programs received by the Servicio de Hidrocarburos from the companies operating in Zones II and III

HILLMAN-KELLEY

first in POWER TONG EQUIPMENT

Hydraulic **POWER TUBING TONG***

Hydraulic **POWER CASING TONG***

Hydraulic **POWER SUCKER ROD WRENCH***

**Also available for air operation*

WRITE FOR DESCRIPTIVE BROCHURE

HILLMAN-KELLEY

Main Office & Plant: 1000 Macy St., Los Angeles 33, California
Division Office: 5959 Clinton Drive, Houston 20, Texas
Branch Offices: Odessa, Texas • Oklahoma City, Okla. • Lafayette, La.
Shreveport, La. • Corpus Christi, Texas • Ventura, Calif. • Bakersfield, Calif.

will be forwarded to the Dirección General de Plazas y Provincias Africanas.

6. The exploitation concessionaires' application for storage and transportation facilities will be negotiated as in Zone I, and it will be submitted to the Dirección General de Plazas y Provincias Africanas by the Director General de Minas for submission to the Minister Undersecretary of the Presidency for resolution.

7. Applications for exploitation concessionaires to put crude products in transportable condition will be the same as for Zone I but prior to a resolution being given, the representative of the Dirección General de Plazas y Provincias Africanas in the Servicio de Hidrocarburos must prepare a report on the application.

8. Payments by grantees in competitive contests and proceeds of auctions of areas which have reverted to the state will be applied to special budgets of the provinces concerned. Unfulfilled compulsory obligations in the case of renouncements shall be paid to the Treasury of the province concerned.

9. The Dirección General de Plazas y Provincias Africanas will pass on permits and concessions concurring in the same area between hydrocarbons and the other substances and, where the holders fail to reach an agreement as to coexistence of their interests, will report on them to the Dirección General de Minas or to the Ministry of Industry for a resolution.

10. Oil companies shall be subject to the general tax laws of the provinces. Tax matters will be dealt with by the Minister of Finance who will collaborate with the Dirección General de Plazas y Provincias Africanas for enforcement purposes through the Comisión de Coordenación of the Ministry. Other fiscal, economic and financial matters pertaining to the Ministers of Finance and Industry will be carried out by their representatives on the Comisión de Coordenación.

11. Surface fees for permits and concessions will be calculated by the Department of Finance and will be part of the budgets of their respective provinces.

12. Taxes on crude products will be paid monthly into the provincial budgets. The Prime Minister's Department will notify the concessionaire through the Comisión de Coordenación whether to pay in cash or kind. If in cash, the 12½% rate will be applied and a representative of the Prime Minister's Department on the Comisión will fix the price in the manner established in the Regulations.

13. The net profits tax will be calculated annually, applying the rules of the Act complemented by the acts and regulations in force for collection of taxes in Spanish territories. The amounts paid as exploitation fees or as the minimum quota on products for each year will be deducted from the total. Taxes will be paid into the budget of the respective Spanish provinces without any prejudice to any distribution the Council of Ministers may decide to make. If the companies operate in both provinces and the mainland, payments will be made to the corresponding treasurer according to the budget to which they refer. If companies are refining or carrying on other obligations, the tax basis for non-exempt activities will be fixed by the rules of the Impuesto Sobre la Renta de Sociedades y Entidades Jurídicas of the Act of December 26, 1957.

14. The Comisión de Coordenación shall have the right to inspect all contracts, books and other records for determining the basis for taxation. The Comisión also will determine what income and expenses are to be used for computing taxes. All functions relating to the negotiated taxes established by the Act of December 26, 1958 will be carried out through the Department of Finance.

15. Companies and contractors may import all materials necessary for their operations without payment of duty on authorization from the Dirección General de Plazas y Provincias Africanas. If the authorization is refused the matter may be appealed to the Minister of the Presidencia del Gobierno. A descriptive list of the items, duly certified by the Servicio de Hidrocarburos, must accompany the request to import duty-free and such list must show the quantity, value, destination and use for the items. Authorized items will receive preferential treatment by all offices concerned over other private merchandise.

The Prime Minister's Department may authorize the duty-free importation of utensils and personal items of company employees. All other items are subject to the general taxes, duties or tariffs, payment of which may be deducted from profits as an expense.

16. Companies are exempt in Zones II and II from Rústica, Urbana and Industrial taxes as well as other direct, national, provincial or municipal taxes.

Dividends payable by companies are also exempt from taxes. Other exemptions include the general tax on crude products, taxes on the issue and transfer of shares, stamp taxes, taxes on patents and capital transfer, and all other exemptions provided in the Act.

Companies are liable for all other taxes in the national territories or provinces provided there is no double taxation or discrimination.

17. The Servicio de Hidrocarburos of the Dirección General de Minas y Combustibles of the Department of Industry shall handle the processing and negotiations for all documents. The Servicio will collaborate with the Dirección General de Plazas y Provincias Africanas of the Prime Minister's Department. Technical personnel will report to the Dirección General de Plazas y Provincias Africanas. The Prime Minister's Department on the request of the Dirección General de Plazas y Provincias Africanas will appoint an official as a liaison officer to represent it at the Ministry of Industry and to be attached to the Servicio de Hidrocarburos of the Dirección General de Minas y Combustibles of the Ministry of Industry.

When the negotiation of documents has been concluded the Minister of Industry will propose that his resolution be implemented by decree to the Council of Ministers. The decree will be signed by the Minister Undersecretary of the Presidencia.

18. The technical and safety inspection of installations, demarcations, setting of landmarks, and all other technical services will be carried out by engineers of the Cuerpos Nacionales de Minas appointed by the Department of Industry at the request of the Dirección General de Plazas y Provincias Africanas. The technical report of the Servicio de Hidrocarburos is also compulsory.

19. Inspection for fiscal and tax purposes will be carried out by the Comisión de Coordinación appointed by the Minister Undersecretary of the Presidencia and made up of representatives of the Departments of the Prime Minister, Industry and Finance.

The objects of the Comisión are to inspect all services and activities of permit or concession holders to see that all fiscal and financial obligations are being fulfilled as provided by the Act and Regulations.

The Prime Minister's Department can also assign other duties to the Comisión.

20. Expenses incurred in negotiations, demarcations, inspections, both technical and safety, will be determined in accordance with the tariffs established by the general legislation on these matters. The tariffs will be implemented by the Servicio with regard to the negotiation of documents and by the Dirección General de Plazas y Provincias Africanas with respect to inspections and demarcations.

All expenses incurred as a result of inspections will be increased by travel and living allowances in the territories of Zones II and III.

When holders request demarcation of their areas, estimates will be drawn in accordance with the Act. If a holder should object to the estimate, it will be submitted to the Minister Undersecretary of the Presidencia for resolution.

21. Sanctions will be carried out by the Prime Minister's Department, the Dirección General de Plazas y Provincias Africanas and the Departments dependent thereon, as well as the Servicio de Hidrocarburos and the Department of Finance. When technical advice of the Departments of Industry, Finance or other Ministry is necessary a report will be requested from them.

NOTE: The above summary of Spanish Regulations for oil form part of an over-all review of Spanish oil regulation compiled by George P. Armour, Legal Department, Atlantic Refining Co. It is published through courtesy of Petroleum Legislation, an international legal reference service for oil laws and concession terms. The entire review, including the Spanish mainland law and its regulations may be obtained from *Petroleum Legislation Ltd.*, Post Office Box 1591, Grand Central Station, New York 17, New York, USA.

VALDEBRO

Drilling Sequence	Name of Well	Coordinates	Year Drilled	Total Depth (Meters)	Results: g: gas l: liquid hydrocarbons s: asphalt
15	Marcilla	1° 58' 58" E. 42° 20' 17" N.	1953	3,415	Dry
20	Castilfrio	1° 22' 48" E. 41° 56' 39" N.	1954	2,400	Dry
24	San Lorenzo	1° 19' 47" E. 39° 51' 46" N.	1955	2,580	Dry
25	Iglesias	0° 16' 10" O. 42° 18' 35" N.	1955–56	2,180	Dry
26	Puigreig	5° 34' 30" E. 41° 58' 30" N.	1956	3,192	Dry
27	Bornos	2° 03' 58" O. 36° 50' 08" N.	1956	3,027	Dry
30	Matienzo	0° 06' 10" E. 43° 18' 16" N.	1956	1,950	Dry
32	Almarchal	2° 07' 00" O. 36° 08' 40" N.	1956–57	3,405	(g)
36	Asperillo	2° 57' 40" O. 37° 04' 38" N.	1957	3,307	Dry
37	Isla Mayor	2° 27' 39" O. 37° 09' 33" N.	1957	2,373	Dry
38	Moguer	3° 06' 53" O. 37° 09' 21" N.	1957	2,473	Dry
39	Almonte	2° 47' 09" O. 37° 15' 45" N.	1957	1,344	Dry
41	Ojén	1° 56' 46" O. 36° 09' 17" N.	1957–58	1,751	Dry
43	Cerrogordo 1	1° 40' 25" O. 36° 21' 15" N.	1958–59	3,559	Shows (g, l)
44	Quintana Redonda	1° 07' 55" E. 41° 39' 01" N.	1958	1,156	Dry
46	Gormaz	0° 38' 05" E. 41° 29' 22" N.	1958	2,200	Dry
47	Monegrillo	3° 15' 30" E. 41° 37' 18" N.	1958	1,446	Dry
48	Pamplona 1	1° 57' 05" E. 42° 51' 03" N.	1958–59	2,788	Shows (g, l)
49	La Zaida	3° 16' 22" E. 41° 19' 39" N.	1958	1,700	Dry
51	Retuerta	0° 02' 51" E. 43° 00' 47" N.	1958–59	3,391	Shows (l)
55	Pamplona 2	1° 59' 12" E. 42° 49' 35" N.	1959	1,810	Dry
56	Cerrogordo 2	1° 43' 50" O. 36° 22' 10" N.	1959	3,377	Dry
59	Monesma	4° 15' 15" E. 42° 14' 41" N.	1959–60	4,750	Dry
62	Pamplona 3	1° 56' 34" E. 42° 50' 52" N.	1959	3,755	(g, g)
66	Bujaraloz	3° 34' 03" E. 41° 25' 25" N.	1960	Drlg.	

Big drilling news from Gardner-Denver

- Drawworks
- Crown blocks
- Traveling blocks
- Swivels
- Rotary tables
- Compounds
- Air compressors
- Mud pumps
- Air hoists
- Water pumps
- Centrifugal pumps
- Impact wrenches

Gardner-Denver is keeping pace with oil industry progress in the development of equipment today for the challenge of tomorrow. Ask your Gardner-Denver petroleum industry specialist about these great new products for deepest drilling.

EQUIPMENT TODAY FOR THE CHALLENGE OF TOMORROW

GARDNER - DENVER

Gardner-Denver Company, Quincy, Illinois—Offices in principal U. S., Canadian and Mexican cities
In Canada: Gardner-Denver Company (Canada), Ltd., 14 Curity Ave., Toronto 16, Ontario
International: Gardner-Denver International Division, 233 Broadway, New York 17, N. Y.

International Offices: Buenos Aires, Argentina; Artarmon, N.S.W., Australia; Brussels, Belgium; Rio de Janeiro, Brazil; Santiago, Chile; Barranquilla, Colombia; Lima, Peru; Ndola, N. Rhodesia; Salisbury, S. Rhodesia; Johannesburg, Transvaal

SWEDEN

EXPLORATION AND PRODUCTION: There is no oil production or exploration in Sweden. Oil possibilities of the country are considered very poor.

REFINING AND MARKETING: There are five principal refineries in Sweden, with a total crude charging capacity of ? b/d. The refineries are as follows:

Axel Johnson & Co., Nynashamn, Sweden: Crude capacity: 2,400 b/d; scheduled for expansion to 3,600 b/d in 1963.

Koppartrans Oljeaktiebolag, Skarvik, Sweden: General manager, P. Betts. Crude capacity: 36,300 b/d. Thermal reforming, 4,000 b/d. Catalytic reforming, 5,000 b/d. Desulfurization, 7,200 b/d. Catalytic reformer is being revamped to Platforming.

AB Nynas-Petroleum. Gothenburg, Sweden: Crude capacity: 3,000 b/sd. Vacuum distillation, 2,300 b/sd.

AB Nynas-Petroleum, Malmo, Sweden: Crude capacity: 1,900 b/sd. Vacuum distillation, 1,500 b/sd.

AB Nynas-Petroleum, Nynashamn, Sweden: Crude capacity: 20,000 b/sd. Vacuum distillation, 4,500 b/sd. Thermal reforming, 1,900 b/sd. Platforming, 6,800 b/sd.

Sweden Shale Oil Co. (Svenska Skifferolje Aktiebolaget), Narkes Kvarntorp, Sweden: Plant superintendent: Gosta Salomonsson. Crude capacity (shale oil, not crude petroleum): 2,000 b/d. Sulfuric-acid treating, 2,000 b/d. Products: gasoline, fuel oil, liquefied gases.

Petrochemicals: Svenska Esso A/B, wholly owned by Jersey Standard, announced in 1960 jointly with two chemical concerns in Sweden, Superfosfat Fabriks A/B and Mo och Domsjö A/B, a project for setting up the country's first petrochemical facilities at Stenungsund, on the west coast, north of Gothenburg. Esso is building a steam cracker, or pyrolysis plant, of 200,000- to 300,000-ton annual input capacity to produce ethylene, propylene, and butadiene, for further processing by the two other companies. Superfosfat is planning a 15,000-ton-per-year polyethylene plant, to be operated in 50/50 partnership with Union Carbide of the USA. Mo och Domsjö will concentrate on the manufacture of ethylene oxide, already undertaken in its chemical plants but to be expanded by the erection of an additional 10,000-ton unit at Stenungsund. The present program is due for completion by mid-1963, but availability of substantial supplies of petro-chemical base-stocks will stimulate the initiation of further lines of chemical manufacture.

NATIONAL FACTORS

A detailed study of taxation of petroleum operations in Sweden has been prepared, and will be available early in 1961 under the title of "*International Taxation Series.*" This series is devoted exclusively to covering every type of tax imposed on petroleum operations in all countries. Marketing, refining, transportation, exploration, and production taxes are covered, with a separate study of each. For an example of one of these national studies (all are prepared in exactly the same format), readers are referred to the Colombia section of this issue of *World Petroleum Report,* i.e., the section entitled "*Colombia—Petroleum Industry Taxation.*" Requests for information should be addressed to "*International Taxation Series,*" *P.O. Box 1591, Grand Central Station, New York 17, N. Y.*

Creation of the European Free Trade Association will give new opportunities to Swedish enterprise. The relatively small size of the Swedish domestic market has made it difficult to develop industries, such as a petrochemical industry. Now all measures of protection against Swedish industrial goods will be gradually removed in the United Kingdom, Denmark, Norway, Switzerland, Austria, and Portugal. Sweden—with her present tariffs much lower than, in particular, in the UK—definitely stands to gain from the new arrangements.

There are at present no discriminatory import duties on crude or major petroleum products.

Another project is linked with Indiana Standard, two petroleum affiliates of the Co-operative Society, and various local chemical firms. This calls for the establishment of a petrochemical complex, including a new oil refinery at Hälsingborg, near the southern tip of Sweden, but fuller details have not as yet been disclosed.

MARKETING: Oil covers about half of Sweden's high energy needs, and the Swedish market has been one of the best in Europe during the past decade. Hard times are facing marketers now, however, with Russian oil competing very successfully against the international companies and a general slowdown in the rate of increase of oil use for heating and fuel oil. A rise of about 50% to around 280,000 b/d to 300,000 b/d is considered likely by 1968. Oil consumption per capita is about 10 bbl per year, highest in the Eastern Hemisphere.

The USSR has captured much of the very important heavy fuel-oil sector of the market, and threatens to take still more in the future. Prices quoted for Soviet oil are below world market levels, and their cost might go down more with the completion of Russian ports on the Baltic. Local distributing companies, such as Axel Johnson & Co., will take substantial amounts of Russian oil; and some crude comes in from Romania as compensation for seized Swedish property. Competition is keen. Esso is distributing from its new Norwegian 2,000,000-ton refinery at Slagen. Tidewater is going to build a refinery at Kalundborg in Denmark, and intends to export part of the output to Sweden, but has as yet no marketing organization in Scandinavia. Petrofina, a relative newcomer to the Swedish market, has now established a second ocean depot, at Treeleborg, in the south of the country.

A new company has been formed, and is distributing cut-price gasoline. Arne Sandberg, director of the company, Aktiebolaget Scenska UNO-X of Trolhattan, said plans are to sell gasoline to about 10 stations in the first stage and later in all cities in Sweden in about three years. Prices were 70 ore per liter compared with 75 ore charged by regular distributors. Sandberg aims to sell 10 million to 15 million liters in the first year. He refused to name the source of his gasoline, but speculation is that it is a West German refinery. Major oil companies are watching the development with keen interest. UNO-X does not own gasoline stations, merely supplies them.

OIL LAWS

There is no separate law for petroleum, which falls under the Mining Act of June 3, 1938, and the Act of May 28, 1886. END

SWEDEN—Imports, 1959
(Thousands of Barrels)

Country	Crude Petroleum	Gasoline	Kerosine	Fuel Oils	Lubricants	Total
United States	—	244	—	506	313	1,063
Puerto Rico	—	—	—	218	—	218
Netherlands Antilles	—	766	627	1,146	111	2,650
Trinidad and Tobago	—	665	265	2,394	—	3,324
Venezuela	2,798	559	171	6,229	21	9,778
Belgium-Luxembourg	—	—	—	440	45	485
Denmark	—	—	—	—	6	6
France	—	584	8	641	1	1,234
Germany, East	—	—	—	171	—	171
Germany, West	—	318	2	251	33	604
Italy	—	383	15	1,719	—	2,117
Netherlands	—	3,424	748	9,987	109	14,268
Norway	—	—	—	—	35	35
Poland	—	—	—	209	—	209
Portugal	—	54	12	80	—	146
Romania	—	—	—	85	—	85
United Kingdom	—	2,586	483	9,289	96	12,454
USSR	—	—	82	9,506	—	9,588
Aden	—	41	—	—	—	41
Bahrain	—	1,371	295	—	—	1,666
Iran	5,946	—	—	1,006	—	6,952
Iraq	—	—	—	6	—	6
Kuwait	4,421	—	—	2,925	—	7,346
Saudi Arabia	4,090	—	—	722	—	4,812
Other	—	—	62	2	2	66
Total	17,255	10,995	2,770	[1]47,532	772	79,324

SWEDEN—Exports, 1959
(Thousands of Barrels)

Country	Gasoline	Kerosine	Fuel Oils [2]	Lubricants	Total
Denmark	22	12	277	33	344
Finland	9	3	—	74	86
Germany, West	48	12	131	—	191
Norway	—	—	113	32	145
United Kingdom	—	—	—	17	17
Egypt	—	—	—	6	6
Other	—	—	—	5	5
Total (1959)	79	27	521	167	794
Total (1958)	4	14	4	102	124

[1] Reported total of fuel oils is estimated to comprise 25,382,000 barrels distillate and 22,150,000 barrels residual.
[2] Includes undisclosed quantities of distillate fuel oil.
Source: American Embassy, Stockholm, through the U.S. Department of State.

from one dependable source

Ethyl has developed a broad line of chemicals—each designed to answer a specific petroleum product or process need.

Antiknocks? Your choice of six—TEL, TML, three mixed lead alkyls and Motor 33 Mix, a manganese-lead antiknock.

Antioxidants? 702 for crank case oils in gasoline and diesel engines, automatic transmission fluids and industrial oils; 703 for greases and synthetic jet-engine oils; 733 for gasolines, jet fuels, industrial oils . . . plus a new antiwear agent and oxidation inhibitor for lube oils. "Ethyl" Antioxidant ZDP (zinc dithiophosphate).

Other additives? Three phosphorus compounds—ICC 1, ICC 3 and ICC 4, all effective in controlling surface ignition and spark plug fouling. Also Multi-Purpose Additive, an economical detergent, anti-icing, anti-corrosion agent. Add a diesel ignition improver, an effective cetane improver for diesel fuels . . . also for gasolines—a metal deactivator and a full range of oil soluble dyes, in powdered, flaked, beaded, or granulated form. All are backed by Ethyl's complete technical service to make *your* products more effective, more economical, better able to build sales in today's highly competitive markets.

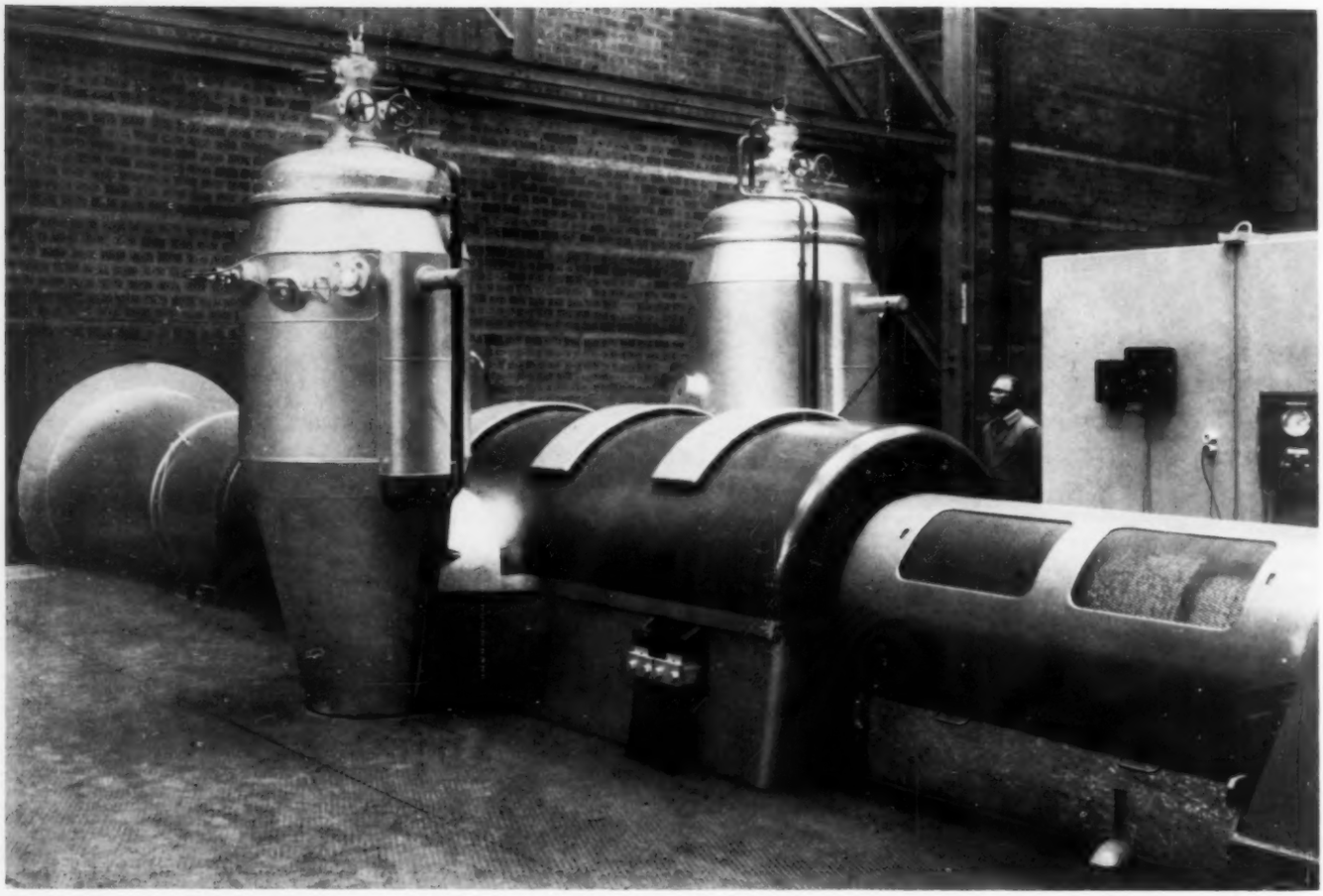
For more detailed information on "ETHYL" products, contact:

ETHYL U.S.A.

ETHYL CORPORATION, 100 PARK AVE., NEW YORK 17, N. Y., U. S. A.

SULZER

Gas Turbines
for Pipelines



Sulzer 3,000-kW Gas Turbine on testbed in Winterthur

SULZER 3,000-kW Gas Turbine

Standard split-shaft version for variable-speed drive of **pipeline** compressors and pumps.

Standard single-shaft version for generator drive.

Other gas turbines with ratings up to 20,000 kW
Axial and centrifugal compressors up to 200,000 c.f.m.

SULZER BROTHERS LIMITED, WINTERTHUR, SWITZERLAND

SWITZERLAND

EXPLORATION: Rising consumption, combined with successful exploration in neighboring countries, has led to an increased effort and a way has finally been found for international capital to participate.

The cantons, opposed to Federal jurisdiction over oil, agreed in 1960 to work on their own, but in accordance with Federal policy directives. A Swiss company was formed, known as Swisspetrol. Owned by Swiss financial and industrial interests, it participates in several exploring concerns, including SEAG, which holds an exclusive exploration right over the Concordat area of Zurich, St. Gallen, Aargau and Thurgau (soon to include Appenzell AR); in LEAG, which has similar rights in Lucerne; and Ste. des Hydrocarbures, with exploration rights in the central part of Vaud and in Neuchâtel. All these companies now have a Swiss majority holding. A German company, Gewerkschaft Elwerath, has minority holdings in each as well as carrying out exploration, including drilling, as operator.

Swisspetrol acquired in 1960 all shares in Petromil which has exploration rights in northern Vaud, and it has a contractual obligation to participate with cantonal interests in a consortium for prospecting in the canton of Berne if necessary cantonal legislation is passed. This gives to companies linked with Swisspetrol concessions over a continuous area covering the larger part of the prospective oil territory. Swisspetrol's finances are very limited, however, and efforts to raise money on the Swiss market were unsuccessful.

In Fribourg exploration and drilling is carried out by BP, under an arrangement reached in 1959 with the Swiss-owned Société d'Intérêts Miniers which was then granted a concession. BP is committed to spending over a period of nine years a minimum of S. Frs. 22.5 million. The arrangement has been opposed but cannot be disapproved by the Federal government on the ground that most of the money is being provided by a foreign concern.

Middleland Oil Co. has a concession in southwest Vaud, on the French border. It is owned 25% by U.S. interests, Texfel Co., and 75% by Swiss interests. A joint venture has been concluded with the French company, PREPA, which will explore the concession area, paying 75% of the cost. Any production found is to be split in the same proportions.

Ste. d'Etudes et de Recherches Minieres et Petroliers received concessions during 1960 in southeastern Vaud and an adjacent area in Valais canton.

A subsidiary of Rimrock Tideland Inc. (owned principally by Husky Oil Co. of Cody, Wyoming), has a concession in Geneva and Ticino cantons. Name of the operating company is MOFAG. Drilling was done by BP, SEAC and Ste. d'Etudes in 1960.

REFINING: There are no refineries in Switzerland at present, although a 500 b/d lube oil plant was constructed at Mendrisio by the Swiss independent, Miranco, in 1960.

A 40,000 b/d refinery is to be built at Aigle (see World Petroleum Report 1960). A pipeline is to be constructed by ENI from Genoa (see map). Work had not yet begun at the end of 1960.

TRANSPORTATION: The cantonal governments of Basle city and Basle county, together with local private interests, decided in 1960 to form jointly a company with the object of building and operating products pipelines from the Rhine port of Basle to other consumption centres in Switzerland. It is hoped that this will add to the attractions of oil imports via Basle, as against imports via other routes, notably from the south through Italy.

MARKETING: The fast growing Swiss market continued its growth during 1960 with an estimated 14% increase over 1959.

The Federal Parliament approved an increase in the tax on gasoline during 1960 by 7 centimes/litre.

OIL LAWS

There is no federal jurisdiction over oil exploration and development. All such authority is vested in the cantons, and this has given rise to a rather complicated legal situation. For a concise and accurate review of the various cantons' laws, together with a discussion of the Federal government's position, reference is made to *Petroleum Legislation*, a legislative reference service which contains an analysis and summary of the oil laws of every major country. The summaries, compiled by oil companies and law firms within the country concerned, are kept up to date by loose-leaf revision. For information on service inquiries should be sent directly to the publisher, *Petroleum Legislation Ltd., Post Office Box 1591, Grand Central Station, New York 17, New York.*

The cantons have made inter-cantonal agreements governing concessions to be granted within their territories, as covered in World Petroleum Report 1960, page 266. The Swiss central government announced during 1960 abandonment of its plan to amend Switzerland's constitution to give it control of the nation's oil rights, which control will remain with the provinces or cantons.

The canton of Grisons enacted a new law in 1960 regulating pipelines, occasioned by the pipeline application of Soc. Nazionale Metanodotti S. p. A., affiliated with ENI, the Italian government's company. The provisions of the new law are as follows: *Art.* 1: New pipelines (except water line) must receive authorization of the Lower Council (petit counseil). *Art.* 2: Each application must show exact specifications of construction. The applicant may receive a general authorization before submitting specific plans. *Art.* 3: The Lower Council has jurisdiction over the application. It may request the Federal government as well as other interested cantons to approve the plan. The Lower Council may also set tax rates. *Art.* 4: Expropriation rights for right of way may be given. *Art.* 5: The Lower Council has jurisdiction over construction, operation and maintenance of installations. It may prescribe special requirements for operations and safety. *Art.* 6: Operator is responsible for all damage caused and must take out insurance as specified by the Lower Council. *Art.* 7: The Upper Council is authorized to pass an ordinance implementing this decree and may adapt this decree to any federal legislation in the future.

The Federal Council circulated in May 1960 a proposal for a constitutional article giving the Federal government the power to regulate pipelines along with general terms of a new draft Federal pipeline law. Two proposals have been made recently for new pipelines, one for an oil line by Oleodotti Internazionali, which the Italian government will participate through ENI, the other by a Swiss group for a gas line from Lacq field in France to Winterthur in Switzerland. At present a pipeline would be subject to the diverse laws of the different cantons it crossed which would probably make construction uneconomic. The proposed constitutional amendment would place pipeline installations within Federal jurisdiction. It includes requirements for predominately Swiss ownership, obligation to transport for third parties and the right of expropriation. It governs rates and deals with civil responsibilities, guarantees by the concessionaire and penalties for infractions.

The Canton of Fribourg submitted a 49-article, 50-50 oil bill to the local parliament in 1960. It would permit exploration and development by citizens of Switzerland or companies incorporated in Fribourg only. Exploration concession duration would be three years. Maximum size is not limited. END

SWITZERLAND—IMPORTS, 1959
(Thousand barrels)

	L.P.G.*	Gasoline	Kerosine Pr.	Kerosine Other	Gas Oil	Other fuel oil	Lubricants	Paraffin and Petrolatum	Asphalt	Total
Bri. Antilles	—	—	—	1	74	—	—	—	2	77
Neth. Antilles	—	84	—	1	12	2	—	—	—	99
United States	1	29	—	—	—	—	109	11	2	152
Venezuela	—	31	—	—	79	10	—	—	—	120
Belg. and Lux	—	1,090	7	14	1,933	188	25	—	—	3,257
Czechoslovakia	—	—	—	—	2	—	—	3	—	5
France	5	414	21	—	1,144	93	26	2	—	1,705
Hungary	—	—	—	—	219	22	7	2	—	250
Italy	1	3,930	337	33	6,960	878	17	—	—	12,156
Netherlands	24	915	16	62	1,261	164	64	1	—	2,507
Rumania	—	5	—	—	87	10	—	3	—	105
United Kingdom	—	43	—	1	85	2	76	—	—	207
U.S.S.R.	—	117	—	—	142	4	—	—	—	263
W. Germany	20	526	—	1	824	123	43	11	10	1,558
Yugoslavia	—	—	—	—	31	—	—	—	—	31
Iran	—	22	—	2	—	—	—	—	—	24
Iraq	—	—	—	—	31	—	—	—	—	31
Kuwait	—	—	—	—	512	67	—	—	—	579
Other	—	—	—	1	17	12	—	11	1	42
Total	51	7,206	381	116	13,413	1,575	367	44	15	23,168

*Liquid petroleum gas.
Source: "Statistique Annuelle Du Commerce Exterieur De La Suisse" 1959, Bern, through the U.S. Department of State.

UNITED KINGDOM

EXPLORATION: For a review of the history of exploration, given briefly, please refer to the 1960 edition of World Petroleum Report. During late 1960 and early 1961 interest in Britain's oil possibilities started to grow, with Esso applying for a 1.3 million acre exploration license along the south coast. Under English law, the first applicant has priority and Esso will probably receive this acreage.

The excitement was caused by a belief that the Paris Basin exists under the English Channel from France to southern England. BP Exploration Co. Ltd. brought in an oil well in 1959 at Kimmeridge in Dorset, near the south coast, 150 miles from the nearest production in the east Midlands. The new well was a producer at about 1,800 feet in middle Jurassic Cornbrash limestone—the first Jurassic production in Britain, virtually all of the previous production having been found in Carboniferous beds. Although the Kimmeridge find is probably small, it resembles the Paris Basin fields producing from the Dogger formation in France.

During 1960 BP Exploration Co. Ltd. continued to search for oil and natural gas. Exploration has continued to concentrate mainly on the Carboniferous structures in the areas around the existing fields in the East Midlands, and some work has been done in the Carboniferous area of northeastern England and in the Mesozoic area of southern England.

The main targets in the Carboniferous rocks of the East Midlands are sandstones in the Lower Coal Measures and Millstone Grit Series.

Development drilling continued at Bothamsal, Corringham and Gainsborough. At Bothamsall, seven wells were completed in 1960, three of which produced oil and four of which were dry. At Corringham, two wells were completed, one of which was dry, making a total of five wells drilled to date. Two wells were completed at Gainsborough, one of which was dry, and with one well now drilling this field totals six wells to date. At Egmanton, one well was drilled in 1960 to explore the new pool found in a fault trap on the south side of this field last year, and oil was proved structurally lower than in the discovery well.

An exploration well at Apleyhead, sited on a culmination defined by seismic work one mile north of Bothamsall Field, found oil in the same sandstone as at Bothamsall and was completed as a producer. Other wells also located on seismic highs include South Leverton, which proved oil near the top of the Millstone Grit Series, Grove and Blyton presently drilling, and Bingham No. 2, which was a dry hole.

In the northeast of England, a well at Harton located on surface geological information and drilled jointly with the Gas Council of Great Britain was dry.

In the Mesozoic area of southern England, a borehole at Winchester drilled by the Gas Council (see below) was deepened to the Lower Jurassic without success. A geological information hole at Twyford (Buckinghamshire) found an accumulation of gas in a basal Mesozoic sandstone which overlies the Palaeozoic unconformably. A nearby hole at Marsh Gibbon was dry. At Kimmeridge, two step-out wells were drilled, one east and one west of No. 1. Both had showings of oil in the Middle and Upper Jurassic, and the former was drilled as far as the Lias. A shallow structure-proving well was also drilled.

On behalf of the Gas Council, five wells in Kent have been completed and four in Hampshire.

PRODUCTION: During 1960, production averaged about 1,740 b/d. This compares with about 1,700 b/d (82,643 tons) produced in 1959. With the exception of a very small quantity from Lancashire, and some test production from the Jurassic of Kimmeridge, Dorset, all the oil produced has been from sandstones in the Coal Measures and Millstone Grit Series of the Carboniferous System in the east Midlands area.

United Kingdom—Crude Oil Production 1960

January	6186	July	6998
February	6615	August	7141
March	7208	September	7204
April	7002	October	7500*
May	7262	November	7300*
June	72–7	December	7500*

Year (1960) 84,943 (1,740 b/d). *estimated.

All production is by British Exploration Co. Ltd., with the exception of about two barrels per day which Esso produces in Scotland.

TRANSPORTATION: Pipeline projects include the completion of British Petroleum's 60-mile 18-in. crude line from Popton Point in Milford Haven to Llandarcy refinery, while Esso Petroleum hopes parliamentary sanctions will be completed to allow construction of two lines from Fawley refinery to start in January. Both will be 70 to 75 miles long, one supplying ethylene to Imperial Chemical Industries' new Severnside Works and the other, a 10-in. 43,000 b/d product line, will feed a new 575,000-barrel distribution depot near London airport.

Shell Refining Co. has brought in a new system of pipelines for transporting chemical feedstock and various gaseous and liquefied gas streams (e.g., ethane, ethylene and propane-propylene) between its Stanlow (Cheshire) refinery and Shell Chemical Co.'s works at Carrington. The fuel oil, gas oil and gasoline transfer pipelines from Stanlow to the Shell-Mex and BP depot at Partington have also been completed.

REFINING: Total refining capacity is 49.3 million tons (about 986,000 b/d) compared with 43.4 million tons at end-1959. During the second half of 1960 Esso Petroleum's 4.5 million ton/year refinery at Milford Haven (Pembrokeshire), was completed, and, British Petroleum's Kent refinery rose from 7.1 to 9.0 million tons per year following the completion of additional tankage.

Actual refinery throughput averaged 3,520,700 tons a month over the first seven months of 1960, compared with 3,237,800 tons in the same period of 1959 and 3,261,300 tons over the whole year.

British Petroleum will build a 1,300,000 ton/year refinery at Belfast in Northern Ireland, requiring an initial investment of £8 million. This will be Northern Ireland's first oil refinery and it will produce gasoline, kerosine, aviation turbine fuels, light and heavy diesel oils, fuel oil and liquefied petroleum gas. Construction is expected to start during 1961 and the project will take about two years to complete. Products will be marketed in Northern Ireland by Shell-Mex and BP, but there will be a margin for export.

The Getty group may eventually enter the UK market through Tidewater Oil Co. (England) Ltd. and build a refinery near Holyhead (Anglesey, North Wales). An 82-acre site has been purchased with excellent deepwater facilities, with an option on more land. Official permission has already been secured for an ocean terminal and storage installation. The Italian ENI group is also known to be interested in UK refining.

The second half of 1960 saw the purchase by Lobitos Oilfields of the entire ordinary share capital of Manchester Oil Refinery (Holdings) Ltd. Late in 1959 Lobitos had acquired another independent refiner—Dussek Bros. Ltd., specializing in products for the electrical, printing and paint industries.

British Petroleum Co. has started work on a 23,000 b/d catalytic reformer at its Kent refinery to meet the increasing demand for high octane gasoline. Completion is set for early 1962. This will be the third unit of this type at Kent; the first two, commissioned in 1955 and 1958 have capacities of 6,000 b/d and 10,000 b/d respectively.

BP has also recently completed a 30,000 ton/year special solvents plant at the same refinery, the company's first such plant in the UK.

A new and comprehensive bitumen cutback installation has also been commissioned at Stanlow, while at the Ardrossan (Scotland) refinery a new inline blending system for bitumen cutbacks based on the use of air electronic ratio controller is now in regular operation.

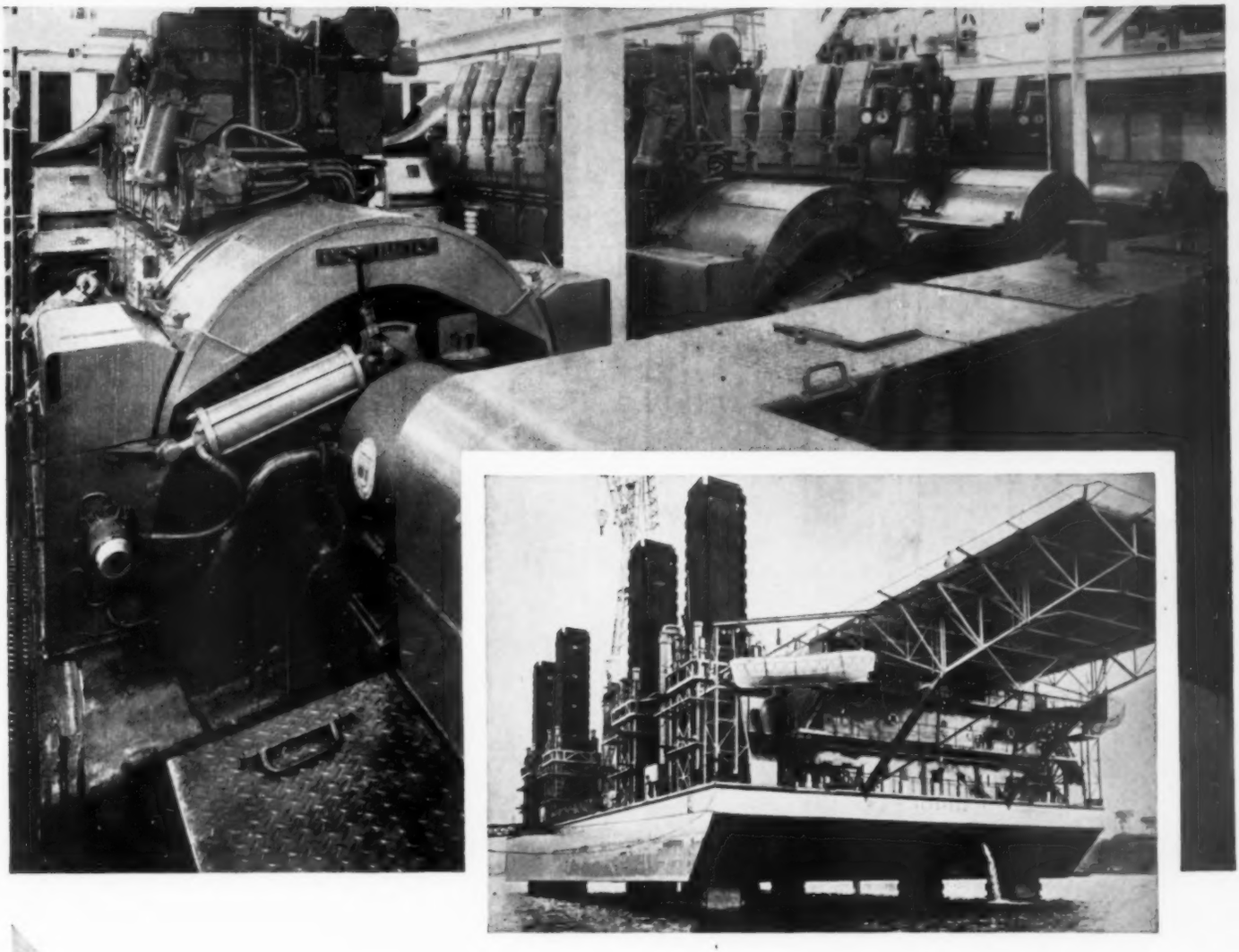
Lobitos is constructing a 5,000 b/d atmospheric/vacuum crude distillation unit and ancilliary plant at Ellesmere Port costing £1.5 million which will replace the existing distillation plant. Completion is due towards end-1961.

Petrochemicals: Refinery deliveries for petrochemicals were 151,300 tons in August, 1960 and the eight-month average, at 130,100 tons, showed a 57% rise over the average of 82,700 tons in the same 1959 period. With the rising tendency shown, total petrochemical feedstock deliveries may well be 1.5 million tons in 1960 against just over a million in 1959.

The growth rate of the plastics sector has outstripped almost every other sector of the chemical industry and shows no sign of abating. In 1959 UK sales of plastics and synthetic resins exceeded half a million tons. Polythene contributed the most of this expansion, and seems likely to continue to do so; it is estimated that production capacity by the end of 1961 will exceed 175,000 tons (including a minor amount of polypropylene) compared with 75,000 tons in 1958. Polyvinyl chloride and polystyrene come next in order of importance.

It has been estimated that by 1970 the UK will be producing about 1.25 million tons of plastic material generally, which represents an average growth rate of 8.7% compound per annum. Polypropylene, at present available in only small quantities, will undoubtedly have a large share in this growth.

As a result of rising UK production (57,000 tons in 1959) and of increased imports of synthetic rubber, the proportion of synthetic to total new rubber being consumed in the country has gone up from 3.6% in 1954 to about 30.4% (i.e., 79,000 tons) in 1959.



Diesel power for "SEASHELL"

OIL DRILLING IN THE PERSIAN GULF

The main power needs of 'SEASHELL', a mobile oil-drilling platform barge of Bataafsche International Petroleum Maatschappij operating in Doha Bay, Qatar, are provided by six 'ENGLISH ELECTRIC' diesel engines.

The four illustrated are six-cylinder pressure charged, charge-cooled engines, with a continuous site rating of 795 b.h.p. at 900 r.p.m. Two of these engines drive the draw-works and rotary table through 'ENGLISH ELECTRIC' 500 kW generators and 650 h.p. motors. Surplus power can be used by means of splined clutches to supplement the power of the other two engines driving the slush pumps.

Another two engines developing 470 b.h.p. at 900 r.p.m. are coupled to 326 kW alternators providing the normal power supply of the barge itself.

'ENGLISH ELECTRIC'

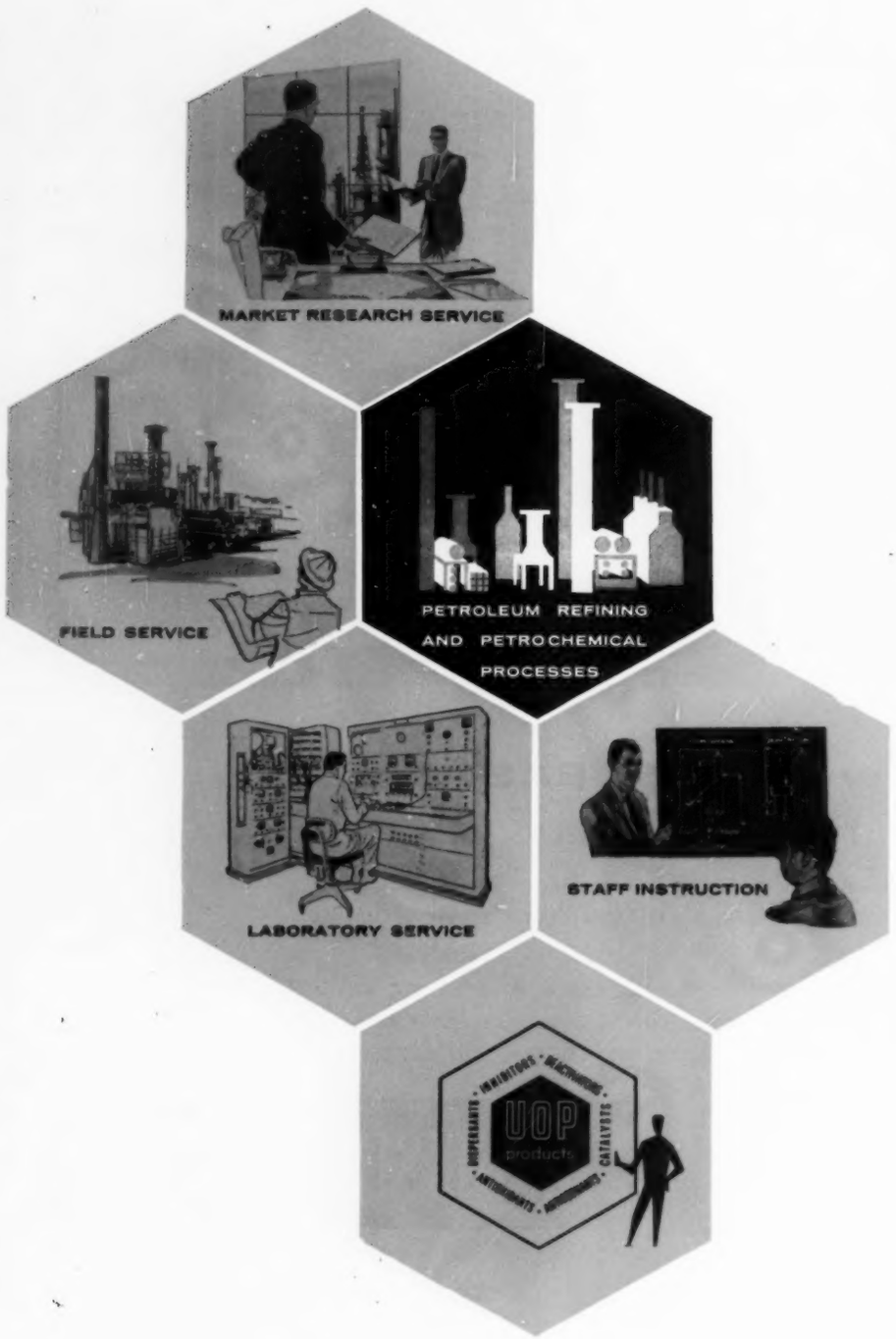
diesel engines

THE ENGLISH ELECTRIC COMPANY LIMITED, ENGLISH ELECTRIC HOUSE, STRAND, LONDON, W.C.2

DE103

Offices and representatives throughout the world

UOP PROCESSES, PRODUCTS AND SERVICES FOR THE PETROLEUM INDUSTRY



Shown here are the basic UOP activities serving the petroleum industry. UOP will be happy to provide more detailed information on any UOP process, service or product.

PETROLEUM REFINING AND PETROCHEMICAL PROCESSES . . . in all UOP offers 23 processes for the production of the full range of petroleum products.

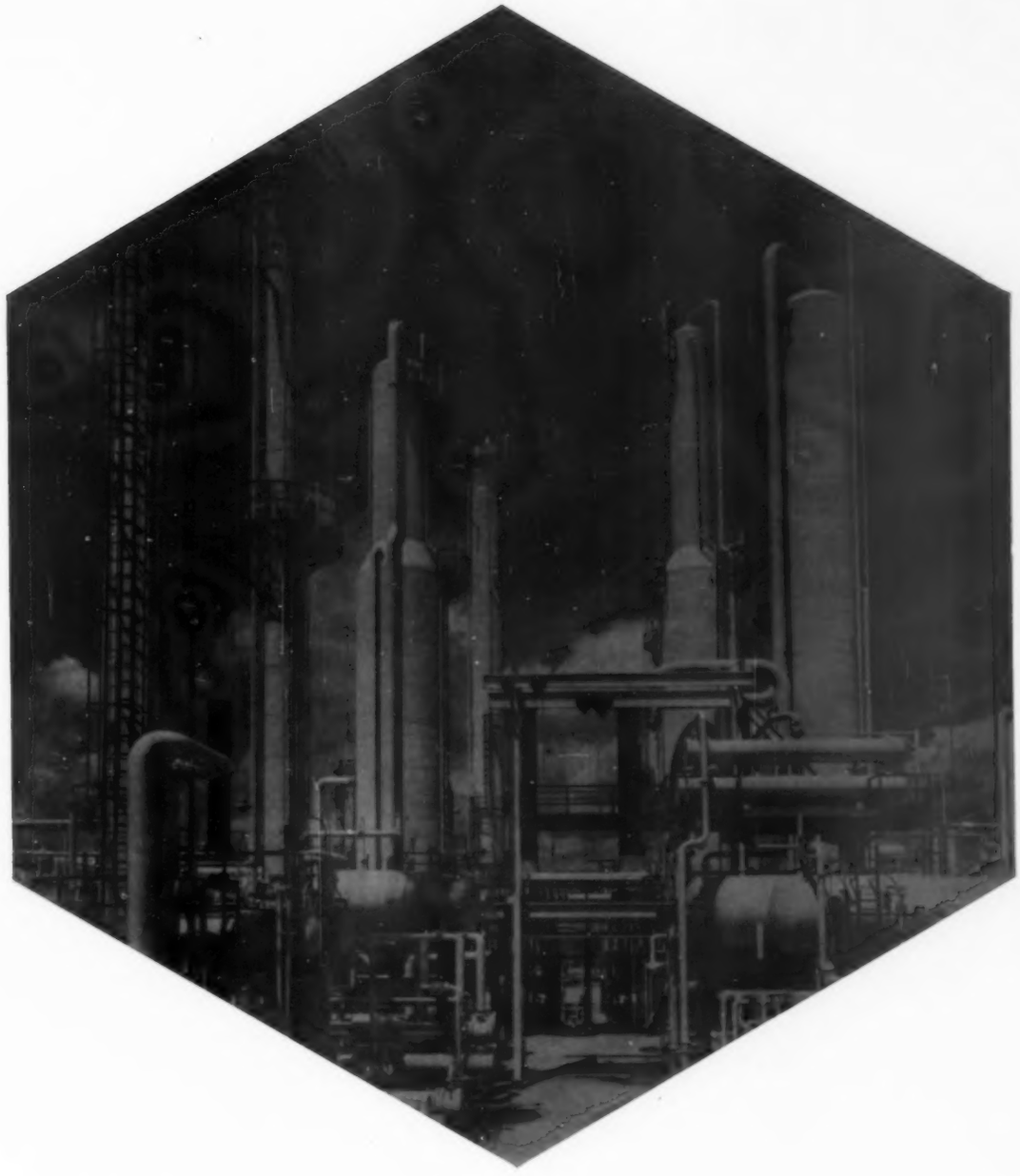
MARKET RESEARCH SERVICE... includes evaluation of markets and potentials, geographic factors, marketing trends, personnel requirements, and process application planning.

FIELD SERVICE . . . UOP maintains an experienced staff of refinery experts located in strategic areas of the free world. These specialists are available to handle processing and allied problems encountered by refiners.

LABORATORY SERVICE . . . Available to refiners, this service consists of crude evaluation, product stability analysis, gas concentration equipment performance, and allied problems in processing and product quality.

REFINERY STAFF INSTRUCTION . . . UOP provides expert staff instruction in training refiner's process operators in conjunction with the installation of UOP process units.

UOP PRODUCTS . . . UOP catalysts, developed and manufactured to exacting specifications of purity and high activity, assure efficient processing. In addition UOP offers a wide range of inhibitors and antioxidants for maintaining the quality of petroleum products. These additives enable refiners to solve such problems as product contamination, stability, color, viscosity, gum formation, and maintenance of octane values.



why UOP serves the petroleum industry so well

The fullest measure of service to the petroleum refining industry has been and will continue to be UOP's purpose. Starting with the research and design of petroleum refining and petrochemical processes, through the field and laboratory services performed in conjunction with these processes, UOP has directed its capacity to provide a wide variety of elements needed to aid the refiner in producing and marketing the best quality petroleum products.

Keeping refined products stable and maintaining product quality in transportation, storage, and use is an important area of UOP's aid to refiners. Over the years Universal has developed a wide range of petroleum inhibitors and additives to give refiners a reliable and economical means to safeguard the quality of their petroleum products.

Hundreds of refiners the world over are customers for UOP processes, services and products. Some use all . . . others use only certain specific processes, services or products. If you have a petroleum processing, marketing or product quality problem, talk it over first with UOP.

WHERE RESEARCH TODAY
MEANS PROGRESS TOMORROW

UOP®

UNIVERSAL OIL PRODUCTS COMPANY

30 Algonquin Road, Des Plaines, Illinois, U. S. A.

Average growth rate on non-cellulosic fibers (the trude synthetic fibers, derived predominantly from mineral sources) over the next ten years may be around 11% per annum, bringing UK output from 38,000 tons in 1959 to some 135,000 tons in 1970.

At present UK sales of synthetic detergents are some 300,000 tons of finished products a year, three times the 1951 figure, and the 1959 consumption of the organic surface-active agents, mainly based on petroleum, is put at 45,000 tons. Only a modest increase, however, is seen for synthetic detergents.

Among the highlights of BP's operations during 1960 is the company's expansion in the field of petroleum chemicals. Announcement of two major projects was made in October 1960.

The first is for a £10 million plant to be established in South Wales, near BP's Llandarcy refinery, for the manufacture of petrolgum chemicals from feedstock from the refinery. This will be operated by British Hydrocarbon Chemicals Ltd., jointly owned by BP and The Distillers Company Ltd., which for the past ten years has been engaged in the petroleum chemical industry at Grangemouth, Scotland, where production has been increased five-fold from the time operations started.

The second scheme is for a joint venture with California Chemical Co. for the construction of two aromatics manufacturing plants in Europe, one next to BP's Kent refinery, Isle of Grain, and the other at Dinslaken, Western Germany. The cost of this project is £7 million.

In September, a new refining unit was commissioned at Kent refinery for the manufacture of special boiling point solvents, used in the manufacture of paint and lacquers and also in the essential oils, fatty oils and rubber industries. The total capacity is 30,000 tons a year.

Courtaulds Ltd. will build a new "Courtelle" acrylic fiber plant at Grimsby (Lincs.) even though a 10 million lb/yr plant of this type only went into production early in 1959. This should be in production early 1962.

Esso Petroleum Co. has recently announced a 30,000 ton/yr butyl synthetic rubber plant is to be built as an extension to the Fawley refinery at a cost estimated at £4¼ million. This is expected to take two to three years for completion and its capaciy wtill meet all UK requirements for a considerable period as well as giving a surplus for export. Butyl rubber has not so far been made in the UK. A steam cracker with ethylene and butadiene extraction plants is being built at Fawley by Foster Wheeler Ltd. at a cost of £5.5 million. Completion is set for end-1961. This is part of a petrochemical feedstock expansion project which will also supply ethylene for delivery by pipeline to Imperial Chemical Industries' new petrochemical works at Severnside near Bristol.

British Hydrocarbon Chemicals, the largest UK manufacturer of styrene monomer, is currently completing its third expansion at Grangemouth, raising production capacity to 50,000 tons a year. It has recently announced that a £3 million, 50,000 ton/year plant will be built in South Wales.

A Montecatini license was acquired in 1960 for the exclusive UK production of staple fibers, filament yarns and textile monofilaments from polypropylene. A 200-acre site has been bought at Kilroot in County Antrim (Northern Ireland) where plant estimated to cost £5 million is to be built for the manufacture of "Terylene" and possibly other man-made fibers.

An earlier (1958) agreement covered the UK production of polypropylene under Montecatini/Ziegler patents for use as a plastic. This is termed "Propathene" by ICI and a 10,000 ton (20 million lb/year) plant at Wilton was understood to be going into commission early November, although no announcement had then been made. Associated with this is a new bulk plant for making organo-aluminum compounds for use as catalysts in this synthesis.

Expansion of the capacity of the three Wilton olefin plants for high purity ethylene from 120,000 to 140,000 tons a year is proceeding, with corresponding increases in the other products of these plants, will give larger feedstock supplies for both Wilton and Billingham units depending on the olefin plants. Acetone capacity, for instance, will go up from 28,000 to 36,000 tons a year by mid-1961, and carbonylation plant output is being extended to cope with increased domestic and export demand for butanols and other higher alcohols.

The 30,000 ton/year methanol plant at Heysham (Lancs.) is being expanded to 75,000 tons, with completion due in 1962.

Progress is being made with the Heavy Organic Chemicals Division's first two plants at the new petroleum-chemical works of Severnside. Costing £5 million, these will produce 35,000 tons a year of ethylene oxide, kethylene glycol, and associated products, with completion due towards end-1961. Ethylene oxide will be produced by direct air oxidation of ethylene to be supplied by a pipeline now being planned from Esso Petroleum's Fawley refinery.

The second Severnside project will be a 100,000 ton/-year ammonia plant, with associated plants to make urea and fertilizers, estimated to cost £10 million and to be producing in 1963.

The Hythe (Hampshire) plant of International Synthetic Rubber Co. Ltd. was expected to have been raised to 85-90,000 tons a year of lower solids latex by end-1960, mainly for tire manufacture, and it has been stated output may pass the 100,000 ton/year mark by mid-1961.

In addition, the company has recently announced the start of production of high solids latex for foam rubber manufacture and the present capacity of 3,500 tons a year is to be doubled in the near future. It is stated that when the present minor extensions are completed an extra £80,000 will have been spent on the plant, which initially cost £6 million.

Shell International Chemical Co., London and National Distillers & Chemical Corp., New York, are forming a joint company to develop plans for producing and marketing polyolefin film and plastic packaging materials outside the US and Canada. No details of plans have yet been given.

Sto-Chem Ltd., a new company, has been set up recently by Witco Chemical Co. Inc. and United States Rubber Co. to acquire a 20 acre site at Toke Prior (Worcestershire) and to build an 8 million lb/yr plant to make a wide range of synthetic rubber latices under a license granted by the Naugatuck Chemical Division of the United States Rubber Co.

MARKETING: Oil was replacing coal in the UK in the first six months of 1960 at an annual rate of 38 million tons, an increase of 22 million tons over 1956. The Central Electricity Generating Board increased its oil consumption from 250,000 tons in 1956/57 to 3.2 million in 1958/59 and 4.5 million in 1959/60—a rise in coal equivalent of some 7.5 million tons in but four years. The board has stated that present plans suggest that in 1965 oil and nuclear energy will each be contributing something like 10% of its total energy requirements.

CAPACITY OF UK REFINERIES
(1000 tons per year-end—1960)

Esso Petroleum Co.	Fawley	11,500
	Milford Haven	4,500
		16,000
Shell Petroleum Co.	Shell Haven	8,000
	Stanlow	5,400
	Heysham	1,900
	Ardrossan	160
		15,460
British Petroleum Co.	Kent	9,000
	Grangemouth	3,100
	Llandarcy	3,000
	Pumpherston	180
		15,280
Mobil Oil Co.	Coryton	1,900
Berry Wiggins & Co.	Kingsnorth	160
	Weaste	120
		280
Lobitos Oilfields Ltd.	Ellesmere Port	200
Manchester Oil Ref.	Trafford Park [1]	150
Wm. Briggs & Sons	Dundee	41
United Kingdom Total		49,311

[1] Now Lobitos Oilfields Group.

The gas industry, too, is using steadily increasing quantities of oil for coal gas enrichment—749,000 in 1959/60 against 666,700 tons in 1958/59—while the amount of refinery gas bought rose to 113.1 million therms from 64.7 million therms, accounting for 4.0% of the total town gas supply against 2.2%. Consumption of gas oil for town gas enrichment is estimated by Esso Petroleum as doubling in the next five years.

Import of oil in the first nine months of 1960 rose 11.2% for crude oil, 9.3% for refined oil, and 10.7% for total imports over the same period of 1959.

Liquid product exports are also running higher, totalling 46,710,900 barrels (value £69.9 million) against 40,358,300 barrels (£64.8 million) over these periods.

On this basis it could be assumed that the 1960 import total would be of the order of 430 million barrels, of which 330 million would be crude, but this may well be an underestimate by reason of the startup of Esso Petroleum's Milford Haven refinery and the higher throughput of British Petroleum's Kent refinery.

Intensified competition in all avenues of oil trading occurred in 1960 and the majors are faced with the entrance of at least two new influential competitors. These are Total Oil Products (G. B.) Ltd. and The Rank Organisation.

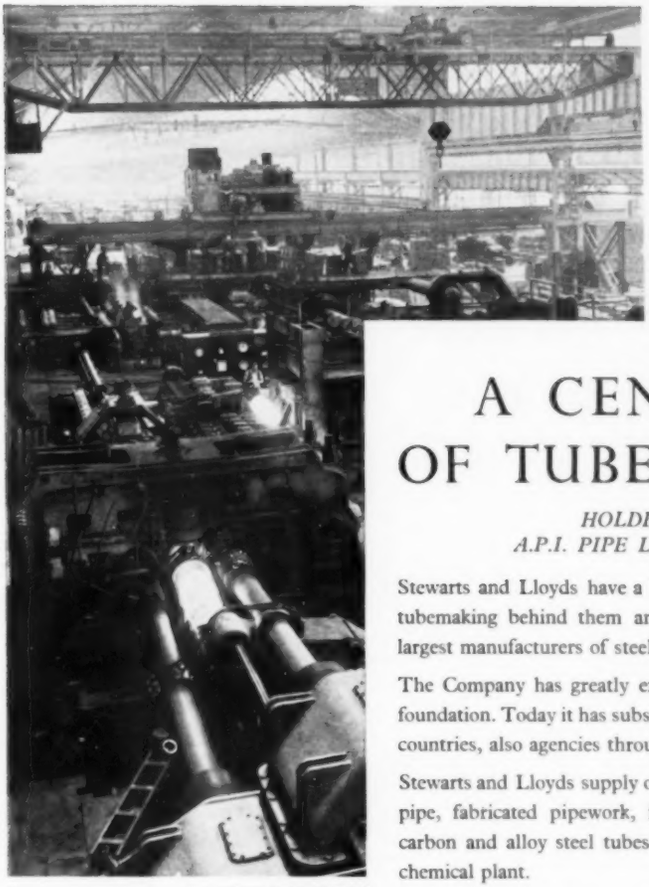
UK FUEL CONSUMPTION

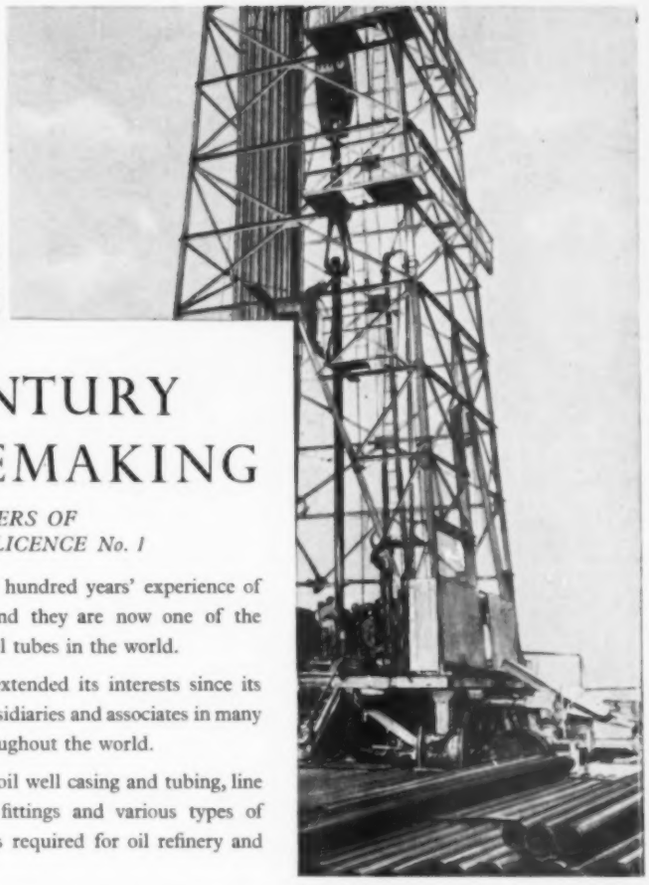
	OIL (A)		COAD, ETC. (C)		
Year	Million Tons (B)	Per Cent	Million Tons	Per Cent	Total
1959	47.5	19.3	125.1	50.8	246.0
1958	42.0	16.9	134.9	54.3	248.3
1950	21.7	9.6	144.9	66.7	224.8

Notes: (A) Direct use. (B) Coal equivalent. (C) Includes coke, other solid fuel, and coke oven gas.

UK IMPORTS IN 1,000 BARRELS
January to September

	1960	1959
Crude Oil	244,677	220,100
Refined Oil	76,176	69,687
Total	320,853	289,787
	355.6	348.8





A CENTURY OF TUBEMAKING

HOLDERS OF
A.P.I. PIPE LICENCE No. 1

Stewarts and Lloyds have a hundred years' experience of tubemaking behind them and they are now one of the largest manufacturers of steel tubes in the world.

The Company has greatly extended its interests since its foundation. Today it has subsidiaries and associates in many countries, also agencies throughout the world.

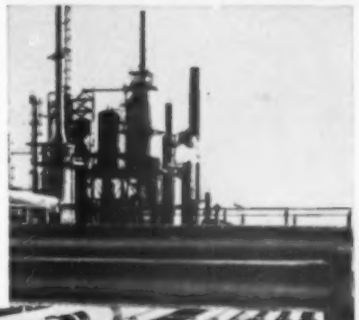
Stewarts and Lloyds supply oil well casing and tubing, line pipe, fabricated pipework, fittings and various types of carbon and alloy steel tubes required for oil refinery and chemical plant.

Stewarts and Lloyds were the first manufacturers to be licensed by the American Petroleum Institute to apply the A.P.I. monogram to their oil country tubular goods.

Enquiries should be addressed to

STEWARTS AND LLOYDS LIMITED

'O' DEPARTMENT
8 Gough Square, Fleet Street, London, E.C.4, England



UNITED KINGDOM—IMPORTS,[1] 1959 (Preliminary)
(Thousand barrels)

	Crude petr. and processed oils	Gasoline	Kerosine	Gas, diesel, and fuel oils [2]	Lubricating oils [3]
Netherlands Antilles	2.829	3.818	2.369	4.645	696
Trinidad	31	6.572	1.282	9.797	—
United States	403	7.444	79	2.383	1.127
Colombia	8.688	—	—	—	—
Peru	992	—	—	—	—
Venezuela	39.241	—	1.012	12.206	384
France	—	1.081	17	1.638	105
Italy	—	—	—	2.293	—
Netherlands	737	2.000	3.076	9.668	761
U.S.S.R.	—	—	—	—	212
W. Germany	—	—	—	330	—
Aden	—	1.008	941	—	—
Bahrain and Qatar	11.552	3.154	1.032	3.753	—
Iran	42.783	528	—	—	—
Iraq	48.422	—	—	—	—
Kuwait	121.605	—	—	—	—
Saudi Arabia	4.534	915	—	225	—
Sarawak	4.339	—	—	—	—
Other Commonwealth countries and Irish Republic	3.834	197	16	3.154	812
Other countries	1.643	4.319	582	4.335	306
Total	291.633	25.036	10.406	54.427	4.403

[1] Other imports: Spirit, other than motor, 987,000 barrels; paraffin wax, 259,000 barrels; other wax, 421,000 barrels; petrolatum, 44,000 barrels.
[2] Gas oil, 15,870,000 barrels; diesel oil, 1,740,000 barrels; fuel oil, 36,817,000 barrels. (Only totals reported.)
[3] Includes other heavy oils.
Source: "Accounts relating to Trade and Navigation of the United Kingdom," December 1959, London, through the U.S. Department of State.

UNITED KINGDOM—RE-EXPORTS,[1] 1959 (Preliminary)
(Thousand barrels)

	Gasoline	Gas, diesel, and fuel oils
Total	587	2.580
Bunkers [2]	—	[3] 27.485

[1] Exports of imported products.
[2] Includes imported and indigenous oil refined in the United Kingdom.
[3] "Fuel oils." Taken on board vessels under British flag, 19,680,000 barrels; vessels under other flags, 7,805,000 barrels.
Source: See Import table.

UNITED KINGDOM—EXPORTS,[1] 1959 (Preliminary)
(Thousand barrels)

	Gasoline	Gas, diesel, and fuel oils [2]	Lubricating oils [3]
Netherlands Antilles	1.773	—	—
Belgium	—	—	104
Denmark	3.347	8.797	85
Finland	—	—	61
Irish Republic	1.428	1.444	154
Netherlands	810	3.961	142
Norway	1.062	4.670	76
Spain	—	235	—
Sweden	2.475	9.303	83
W. Germany	182	3.788	123
Iraq	—	—	2
Turkey	—	—	35
Ceylon	—	—	54
India	—	—	568
Malaya	—	—	31
Pakistan	—	—	59
Singapore	—	—	31
Algeria	—	69	—
Canary Islands	—	289	—
French West Africa	—	637	—
Kenya	—	—	47
Morocco	—	[4] 33	—
Nigeria	—	—	55
Union of South Africa	—	—	129
Australia	—	—	305
New Zealand	—	—	146
Other Commonwealth countries	12	622	234
Other countries	4.267	1.713	711
Total	15.356	35.561	3.236

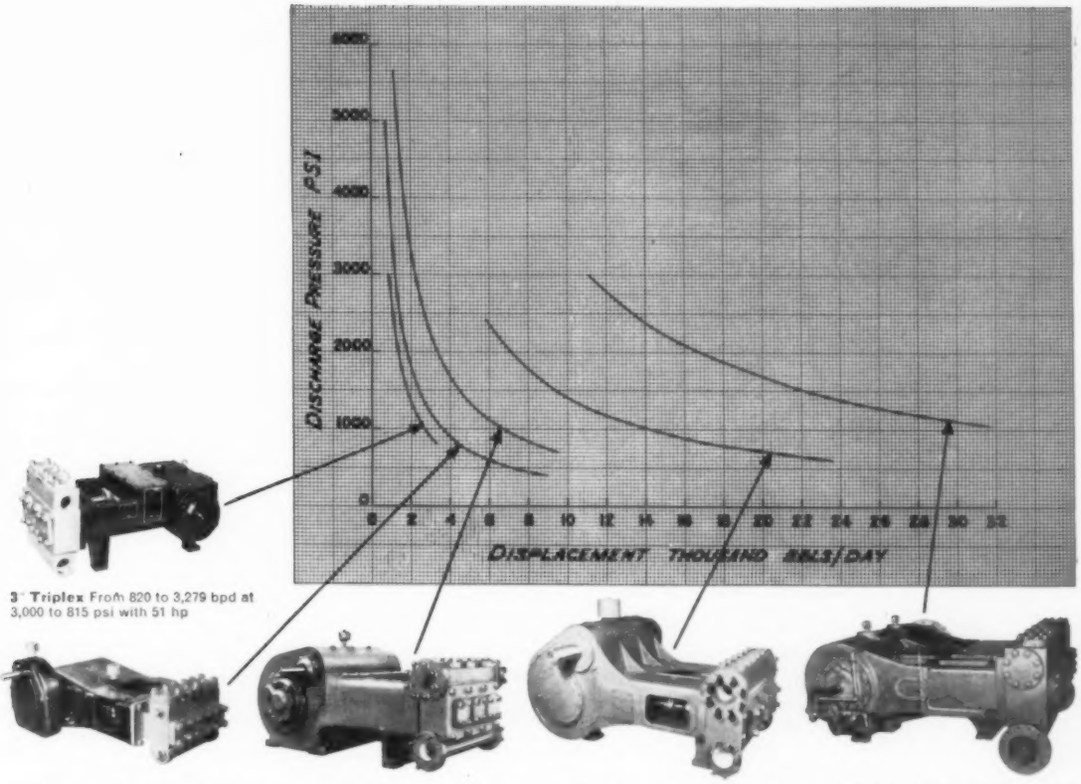
[1] Products manufactured in the United Kingdom. Other exports: Spirit, other than motor, 293,000 barrels; kerosine, 2,778,000 barrels; grease, 170,000 barrels; asphalt, 306,000 barrels; pitch, 1,043,000 barrels. (Only totals reported.)
[2] Gas oil, 12,698,000 barrels; diesel oil, 3,296,000 barrels; and fuel oil, 19,567,000 barrels.
[3] Includes other heavy oils.
[4] Excludes Tangier.

Deliveries into inland consumption rose 17.5% in 1959 over 1958—to 36.5 million (long) tons from 31.6 million. Based on the official "Digest of Statistics," deliveries totalled 25.3 million tons in the first eight months of 1960 against 21.3 million tons in the same period of 1959, a rise of 18.4%. All indications point to a 1960 total of 39.5 to 40 million tons at least.

Esso Magazine (Autumn 1960) has suggested as a "reasonable" forecast that UK demand will have risen to 50 million tons (1,000,000 b/d) by the middle 1960's reaching 57 million tons in the early 1970's. If consumption continues to rise at only half the 1958-60 rate the 50 million mark may well be passed in 1963.

Monthly average deliveries of gasoline and diesel engine road fuel were 844,600 tons for the first eight months of 1960, a rise of 8.8% over the 775,900 tons average over the same 1959 period.

END



3" Triplex From 820 to 3,279 bpd at 3,000 to 815 psi with 51 hp

4" Triplex From 708 to 8,970 bpd at 5,000 to 400 psi with 66.8 hp

6" Triplex From 525 to 9,480 bpd at 5,650 to 705 psi with 125 hp

8" Triplex From 5,890 to 23,600 bpd at 2,410 to 600 psi with 266 hp

8" Quintuplex From 11,080 to 31,725 bpd at 3,000 to 1,050 psi with 630 hp

Sizing the best pump for your Fluid-Injection Applications

. . . is a relatively simple matter with the new selection manual on plunger pumps just published by "Oilwell."

The characteristic curves above indicate the wide ranges of volume and pressures available in the present "Oilwell" line of five primary pump sizes. In the selection manual you will find complete performance data for all plunger sizes available for use with each size pump.

We invite you to send for your copy of "Plunger Pump Selection Manual" (M29-1060) on your oil company letterhead. Take advantage of our time-proven experience and services. Thirty-three years of plunger pump building know-how for this service enable us to meet a wide variety of different applications, including abrasive slurries, corrosive salt water or liquified petroleum gas.

Let us help you with your troublesome or abrasive pumping problems.

USS and "Oilwell" are registered trademarks

This mark tells you a product is made of modern, dependable Steel.

USS Oil Well Supply Division of United States Steel

Executive Offices: Dallas, Texas
Export Office: 30 Rockefeller Plaza New York 20, N. Y.

European Equipment Suppliers Index

European Continental advertisers in World Petroleum Report 1961 are shown below, indexed by the type of equipment supplied. For an alphabetical listing of all advertisers, see the last page.

ABSORPTION PLANTS
DIDIER-WERKE AG., Essen, Germany
HYDROCARBON MINERALÖL GMBH., Düsseldorf, Germany
CARL STILL, Recklinghausen i.W., Germany
BORSIG AG., Berlin-Tegel (Germany)
THEODOR GRÄBENER, Werthenbach Kr. Siegen, Germany
FRIEDRICH UHDE GMBH., Dortmund (Germany)
GOTTFRIED BISCHOFF K.G., Essen, Ruhr, Germany
MASCHINENFABRIK AUGSBURG-NÜRNBERG A.G., Werk Gustavsburg, Germany
B M A BRAUNSCHWEIGISCHE MASCHINENBAUANSTALT, Braunschweig, Germany
J. F. MAHLER, APPARATE-UND OFENBAU KG, Esslingen am Neckar, Germany

ACETHYLENE AND ETHYLENE FROM HYDROCARBONS
DIDIER-WERKE AG., Essen, Germany
HYDROCARBON MINERALÖL GMBH., Düsseldorf, Germany
HEINRICH KOPPERS GMBH., Essen, Germany
GESELLSCHAFT FÜR LINDE'S EISMASCHINEN AG., Höllriegelskreuth bei München, Germany
FRIEDRICH UHDE GMBH., Dortmund (Germany)
CHEMISCHE WERKE HUELS AG, Marl Kr. Recklinghausen, Germany

ACID-PROOF INSTALLATIONS
FRIEDRICH UHDE GMBH., Dortmund (Germany)
THEODOR GRÄBENER, Werthenbach Kr. Siegen, Germany

ACTIVE CARBON
BASF, BADISCHE ANILIN & SODA FABRIK AG., Ludwigshafen (Germany)
THEODOR GRÄBENER, Werthenbach Kr. Siegen, Germany
GOTTFRIED BISCHOFF K.G., Essen, Ruhr, Germany

ADDITIVES FOR FUELS AND OILS
BASF, BADISCHE ANILIN & SODA FABRIK AG., Ludwigshafen (Germany)
CHEMISCHE WERKE HUELS AG, Marl Kr. Recklinghausen, Germany

AGITATORS
CARL STILL, Recklinghausen i.W., Germany
FRIED. KRUPP MASCHINENFABRIKEN ESSEN, Essen, Germany

AIR SEPARATION PLANTS
HYDROCARBON MINERALÖL GMBH., Düsseldorf, Germany
GESELLSCHAFT FÜR LINDE'S EISMASCHINEN AG., Höllriegelskreuth bei München, Germany

APPARATUS
CARL STILL, Recklinghausen i.W., Germany
BORSIG AG., Berlin-Tegel (Germany)
PHOENIX-RHEINROHR AG., Düsseldorf (Germany)
FRIEDRICH UHDE GMBH., Dortmund (Germany)
THEODOR GRÄBENER, Werthenbach Kr. Siegen, Germany
MASCHINENFABRIK AUGSBURG-NÜRNBERG A.G., Werk Gustavsburg, Germany
MANNESMANN-EXPORT GMBH, Düsseldorf, Germany
FRIEDRICH KOCKS G.M.B.H., Bremen, Germany
B M A BRAUNSCHWEIGISCHE MASCHINENBAUANSTALT, Braunschweig, Germany
WILHELM SCHMIDDING, Köln-Niehl, Germany
FRIED. KRUPP MASCHINENFABRIKEN ESSEN, Essen, Germany
SALZGITTER STAHLBAU GMBH, Salzgitter-Watenstedt, Germany

AUTOCLAVES
C.I.P.I. COSTRUZIONI IMPIANTI PETROLIFERI, INDUSTRIALI S.p.A., Venezia-Marghera (Italy)
BORSIG AG., Berlin-Tegel (Germany)
PHOENIX-RHEINROHR AG., Düsseldorf (Germany)
GUIDO SARTORI S.p.A., Venice (Italy)
MASCHINENFABRIK AUGSBURG-NÜRNBERG AG, Werk Gustavsburg, Germany
THEODOR GRÄBENER, Werthenbach Kr. Siegen, Germany
FRIEDRICH KOCKS G.M.B.H., Bremen, Germany
B M A BRAUNSCHWEIGISCHE MASCHINENBAUANSTALT, Braunschweig, Germany
WILHELM SCHMIDDING, Köln-Niehl, Germany
FRIED. KRUPP MASCHINENFABRIKEN ESSEN, Essen, Germany
SALZGITTER STAHLBAU GMBH, Salzgitter-Watenstedt, Germany

BLOWERS
SULZER BROTHERS LTD., Winterthur (Switzerland)

BOILERS
SALZGITTER STAHLBAU GMBH, Salzgitter-Watenstedt, Germany
BORSIG AG., Berlin-Tegel (Germany)
SULZER BROTHERS LTD., Winterthur (Switzerland)
FRIEDRICH KOCKS G.M.B.H., Bremen, Germany
WILHELM SCHMIDDING, Köln-Niehl, Germany
NUOVO PIGNONE, Firenze, Italy

CARDAN SHAFTS
ARBED, Dommeldange, Luxembourg
HANIEL & LUEG GMBH., Düsseldorf (Germany)
NUOVO PIGNONE, Firenze, Italy

CATALYSTS
KALI - CHEMIE - ENGELHARD KATALYSATOREN GMBH., Hannover, Germany
KALI-CHEMIE AKTIENGESELLSCHAFT, Hannover, Germany
BASF, BADISCHE ANILIN & SODA FABRIK AG., Ludwigshafen, Germany)
CHEMISCHE WERKE HUELS AG, Marl Kr. Recklinghausen, Germany
THEODOR GRÄBENER, Werthenbach Kr. Siegen, Germany

CATERING
„S.H.R.M". STE HOTELERIE ET DE RAVITAILLEMENT MARITIME, Marseille, France
C.S.H. COMP. SAHARIENNE D'HABITATION ET HOTELERIE, Alger-Paris

CHEMICALS FOR THE ABSORPTION OF H_2S AND CO_2 FROM NATURAL GAS
CHEMISCHE WERKE HUELS AG, Marl Kr. Recklinghausen, Germany

CHECK VALVES
STAHL-ARMATUREN SIEPMANN GMBH. KG., Belecke (Moehne), Germany
G. DIKKERS & CO. N.V., Hengelo(Ov.) Industriestraat 15, The Netherlands

CHRISTMAS TREES
CELLER MASCHINENFABRIK GEBRÜDER SCHAFER, Celle, Germany

CLUTCHES
LOHMANN & STOLTERFOHT AG, Witten, Ruhr, Germany
SALZGITTER MASCHINEN AKTIENGESELLSCHAFT, Salzgitter, Bad, Germany
NUOVO PIGNONE, Firenze, Italy

COLUMNS
ARBED, Dommeldange, Luxembourg
CARL STILL, Recklinghausen i.W., Germany
C.I.P.I., COSTRUZIONI IMPIANTI PETROLIFERI INDUSTRIALI S.p.A., Venezia-Marghera (Italy)
FRIEDRICH KOCKS G.M.B.H., Bremen, Germany
BORSIG AG., Berlin-Tegel (Germany)
PHOENIX-RHEINROHR AG., Düsseldorf (Germany)
GUIDO SARTORI S.p.A., Venice (Italy)
MASCHINENFABRIK AUGSBURG-NÜRNBERG AG, Werk Gustavsburg, Germany
MANNESMANN EXPORT GMBH, Düsseldorf, Germany
THEODOR GRÄBENER, Werthenbach Kr. Siegen, Germany
NUOVO PIGNONE, Firenze, Italy
B M A BRAUNSCHWEIGISCHE MASCHINENBAUANSTALT, Braunschweig, Germany
WILHELM SCHMIDDING, Köln-Niehl, Germany
FRIED. KRUPP MASCHINENFABRIKEN ESSEN, Essen, Germany
SALZGITTER STAHLBAU GMBH, Salzgitter-Watenstedt, Germany

COMPENSATORS
FRANZ SEIFFERT & CO. AG, Berlin-Grunewald, Germany

COMPRESSORS—CENTRIFUGAL, RECIPROCATING
MOTORENWERKE THOMASSEN N.V., De Steeg (Holland)
MANNESMANN-MEER AG, Mönchengladbach, Germany
MANNESMANN-EXPORT GMBH, Düsseldorf, Germany

COMPRESSORS
BORSIG AG., Berlin-Tegel (Germany)
SULZER BROTHERS LTD., Winterthur (Switzerland)
MANNESMANN-EXPORT GMBH, Düsseldorf, Germany
MANNESMANN-MEER AG, Mönchengladbach, Germany
NUOVO PIGNONE, Firenze, Italy

CONDENSERS
SALZGITTER STAHLBAU GMBH, Salzgitter-Watenstedt, Germany
HEINRICH KOPPERS GMBH., Essen, Germany
CARL STILL, Recklinghausen i.W., Germany
C.I.P.I., COSTRUZIONI IMPIANTI PETROLIFERI INDUSTRIALI S.p.A., Venezia-Marghera (Italy)
BORSIG AG., Berlin-Tegel (Germany)
PHOENIX-RHEINROHR AG., Düsseldorf (Germany)
GUIDO SARTORI S.p.A., Venice (Italy)
SULZER BROTHERS LTD., Winterthur (Switzerland)
MASCHINENFABRIK AUGSBURG-NÜRNBERG AG, Werk Gustavsburg, Germany
THEODOR GRÄBENER, Werthenbach Kr. Siegen, Germany
B M A BRAUNSCHWEIGISCHE MASCHINENBAUANSTALT, Braunschweig, Germany
WILHELM SCHMIDDING, Köln-Niehl, Germany
FRIED. KRUPP MASCHINENFABRIKEN ESSEN, Essen, Germany

CONTROL PANELS
G-S-T GESELLSCHAFT FÜR SELBSTTATIGE TEMPERATURREGELUNG mbH., Bochum-Riemke (Germany)
GESELLSCHAFT FÜR AUTOMATION mbH., Essen (Germany)
SIEMENS-SCHUCKERTWERKE AG., Berlin-Erlangen (Germany)

CONTROLS, REGULATORS
HEINRICH KOPPERS GMBH., Essen, Germany
G-S-T GESELLSCHAFT FÜR SELBSTTATIGE TEMPERATURREGELUNG mbH., Bochum-Riemke (Germany)
GESELLSCHAFT FÜR AUTOMATION mbH., Essen (Germany)
SIEMENS-SCHUCKERTWERKE AG., Berlin-Erlangen (Germany)
ELLENBERGER & POENSGEN GMBH., Altdorf b.Nürnberg, Germany
G. DIKKERS & CO. N.V., Hengelo(Ov.) Industriestraat 15, The Netherlands

CONTROL SYSTEMS
DIDIER-WERKE AG., Essen, Germany
HEINRICH KOPPERS GMBH., Essen, Germany
G-S-T GESELLSCHAFT FÜR SELBSTTATIGE TEMPERATURREGELUNG mbH., Bochum-Riemke (Germany)
SIEMENS-SCHUCKERTWERKE AG., Berlin-Erlangen (Germany)

CONTROL VALVES
G-S-T GESELLSCHAFT FÜR SELBSTTATIGE TEMPERATURREGELUNG mbH., Bochum-Riemke (Germany)

CONVEYER UNITS
DIDIER-WERKE AG., Essen, Germany
MANNESMANN-MEER AG, Ratingen, Germany
MANNESMANN-EXPORT GmbH, Düsseldorf, Germany

COOLERS
ERNST KIRCHNER, FEUERUNGS- u. INDUSTRIEOFENBAU, Hamburg, Germany
HEINRICH KOPPERS GMBH., Essen, Germany
CARL STILL, Recklinghausen i.W., Germany
C.I.P.I. COSTRUZIONI IMPIANTI PETROLIFERI INDUSTRIALI S.p.A., Venezia-Marghera (Italy)
BORSIG AG., Berlin-Tegel, Germany
PHOENIX-RHEINROHR AG., Düsseldorf (Germany)
GUIDO SARTORI S.p.A., Venice (Italy)
FRIEDRICH UHDE GMBH., Dortmund (Germany)
GOTTFRIED BISCHOFF KG, Essen, Ruhr, Germany
FRANZ SEIFFERT & CO. AG, Berlin-Grunewald, Germany
MASCHINENFABRIK AUGSBURG-NÜRNBERG AG, Werk Gustavsburg, Germany
MANNESMANN-EXPORT GMBH, Düsseldorf, Germany
FRIEDRICH KOCKS G.m.b.H., Bremen, Germany
WILHELM SCHMIDDING, Köln-Niehl, Germany
FRIED. KRUPP MASCHINENFABRIKEN ESSEN, Essen, Germany

COOLING TOWERS
CARL STILL, Recklinghausen i.W., Germany
THEODOR GRABENER, Werthenbach Kr. Siegen, Germany
MANNESMANN-EXPORT GmbH, Düsseldorf, Germany
MASCHINENFABRIK AUGSBURG-NÜRNBERG AG, Werk Gustavsburg, Germany
GOTTFRIED BISCHOFF KG, Essen, Ruhr, Germany

CRACKING PLANTS
DIDIER-WERKE AG., Essen, Germany
HYDROCARBON MINERALÖL GMBH., Düsseldorf, Germany
HEINRICH KOPPERS GMBH., Essen, Germany
CARL STILL, Recklinghausen i.W., Germany
FRIEDRICH UHDE GMBH., Dortmund (Germany)
MASCHINENFABRIK AUGSBURG-NÜRNBERG AG, Werk Gustavsburg, Germany
THEODOR GRÄBENER, Werthenbach Kr. Siegen, Germany

CRUDE OIL DESALTING UNITS
HYDROCARBON MINERALÖL GMBH., Düsseldorf, Germany
ERNST KIRCHNER, FEUERUNGS- u. INDUSTRIEOFENBAU, Hamburg, Germany
CARL STILL, Recklinghausen i.W., Germany
FRIEDRICH UHDE GMBH., Dortmund (Germany)
MASCHINENFABRIK AUGSBURG-NÜRNBERG AG, Werk Gustavsburg, Germany
B M A BRAUNSCHWEIGISCHE MASCHINENBAUANSTALT, Braunschweig, Germany
FRIED. KRUPP MASCHINENFABRIKEN ESSEN, Essen, Germany

DEASPHALTISING PLANTS
CARL STILL, Recklinghausen i.W., Germany
FRIEDRICH UHDE GMBH., Dortmund (Germany)

DESULPHURIZING PLANTS
DIDIER-WERKE AG., Essen, Germany
HYDROCARBON MINERALÖL GMBH., Düsseldorf, Germany
HEINRICH KOPPERS GMBH., Essen, Germany
CARL STILL, Recklinghausen i.W., Germany
FRIEDRICH UHDE GMBH., Dortmund (Germany)
MASCHINENFABRIK AUGSBURG-NÜRNBERG AG, Werk Gustavsburg, Germany

DEWAXING PLANTS
THEODOR GRABENER, Werthenbach Kr. Siegen, Germany
MASCHINENFABRIK AUGSBURG-NÜRNBERG AG, Werk Gustavsburg, Germany
CARL STILL, Recklinghausen i.W., Germany
FRIEDRICH UHDE GMBH., Dortmund (Germany)

DIESEL ENGINES
BORSIG AG., Berlin-Tegel (Germany)
MOTORENWERKE MANNHEIM AG., Mannheim (Germany)
SULZER BROTHERS LTD, Winterthur (Switzerland)
MOTORENWERKE THOMASSEN N.V., De Steeg (Holland)
KLÖCKNER-HUMBOLDT-DEUTZ AG, Werk Ulm, Ulm, Donau, Germany
DAIMLER-BENZ AG, Stuttgart-Untertürkheim, Germany
AUTOMOBILES M. BERLIET, Vénissieux Rhône, France
NUOVO PIGNONE, Firenze, Italy

DISTILLATION PLANTS
DIDIER-WERKE AG., Essen, Germany
HYDROCARBON MINERALÖL GMBH., Düsseldorf, Germany
HEINRICH KOPPERS GMBH., Essen, Germany
CARL STILL, Recklinghausen i.W., Germany
SULZER BROTHERS LTD, Winterthur (Switzerland)
FRIEDRICH UHDE GMBH., Dortmund (Germany)
THEODOR GRABENER, Werthenbach Kr. Siegen, Germany
MASCHINENFABRIK AUGSBURG-NÜRNBERG AG, Werk Gustavsburg, Germany
B M A BRAUNSCHWEIGISCHE MASCHINENBAUANSTALT, Braunschweig, Germany
WILHELM SCHMIDDING, Köln-Niehl, Germany

DRILLING EQUIPMENT
HANIEL & LUEG GMBH., Düsseldorf (Germany)
PHOENIX-RHEINROHR AG., Düsseldorf (Germany)
DAIMLER-BENZ AG., Stuttgart-Untertürkheim, Germany
SALZGITTER MACHINEN AKTIENGESELLSCHAFT, Salzgitter-Bad, Germany
NUOVO PIGNONE, Firenze, Italy

DRYING AGENTS
KALI-CHEMIE AKTIENGESELLSCHAFT, Hannover, Germany

DRYING UNITS
DIDIER-WERKE AG., Essen, Germany
HYDROCARBON MINERALÖL GMBH., Düsseldorf, Germany
J. F. MAHLER, APPARATE-UND OFENBAU KG, Esslingen am, Neckar, Germany

ELECTRIC EQUIPMENT FOR COMPLETE PLANTS
DIDIER-WERKE AG., Essen, Germany
HYDROCARBON MINERALÖL GMBH., Düsseldorf, Germany
SIEMENS-SCHUCKERTWERKE AG., Berlin-Erlangen (Germany)
FRIEDRICH UHDE GMBH., Dortmund (Germany)
DAIMLER-BENZ AG., Stuttgart-Untertürkheim, Germany
ELLENBERGER & POENSGEN GMBH., Altdorf b. Nürnberg, Germany

ELECTRONIC INSTRUMENTS AND CONTROLLERS
G-S-T GESELLSCHAFT FÜR SELBSTTATIGE TEMPERATURREGELUNG mbH., Bochum-Riemke (Germany)

EMERGENCY POWER UNITS
BORSIG AG., Berlin-Tegel (Germany)
MOTOREN-WERKE MANNHEIM AG., Mannheim (Germany)
DAIMLER-BENZ AG., Stuttgart-Untertürkheim, Germany
SIEMENS-SCHUCKERTWERKE AG., Berlin-Erlangen (Germany)
SULZER BROTHERS LTD., Winterthur (Switzerland)

EMULSION SPLITTERS
BASF, BADISCHE ANILIN & SODA FABRIK AG., Ludwigshafen (Germany)
CHEMISCHE WERKE HUELS AG, Marl, Kr. Recklinghausen, Germany

ENGINEERING
C. DEILMANN BERGBAU GMBH., Bentheim, Germany
DIDIER-WERKE AG., Essen, Germany
HYDROCARBON MINERALÖL GMBH., Düsseldorf, Germany
HEINRICH KOPPERS GMBH., Essen, Germany
CARL STILL, Recklinghausen i.W., Germany
GESELLSCHAFT FÜR AUTOMATION mbH., Essen (Germany)
COMPAGNIE FRANCAISE d'ETUDES ET DE CONSTRUCTION TECHNIP, Rueil-Malmaison (S. et O.) (France)
FRIEDRICH UHDE GMBH., Dortmund (Germany)
MANNESMANN-ROHRLEITUNGSBAU GMBH, Düsseldorf, Germany
MASCHINENFABRIK AUGSBURG-NÜRNBERG AG, Werk Gustavsburg, Germany
B M A BRAUNSCHWEIGISCHE MASCHINENBAUANSTALT, Braunschweig, Germany

E-T-A Trip-free Miniature Overcurrent Circuit Breakers for overload protection, time and temperature control, with and without quick-release and additional signal contacts
ELLENBERGER & POENSGEN GMBH., Altdorf b. Nürnberg, Germany

ETHYLENE RECOVERY PLANTS
DIDIER-WERKE AG., Essen, Germany
HYDROCARBON MINERALÖL GMBH., Düsseldorf, Germany
HEINRICH KOPPERS GMBH., Essen, Germany
GESELLSCHAFT FÜR LINDE'S EISMASCHINEN AG., Höllriegelskreuth bei München, Germany
CARL STILL, Recklinghausen i.W., Germany
FRIEDRICH UHDE GMBH., Dortmund (Germany)
MASCHINENFABRIK AUGSBURG-NÜRNBERG AG, Werk Gustavsburg, Germany

EXPLORATION AND EXPLOITATION
C. DEILMANN BERGBAU GMBH., Bentheim, Germany
DEUTSCHE SCHACHTBAU & TIEFBOHRGESELLSCHAFT mbH., Lingen, Germany
HANIEL & LUEG GMBH., Düsseldorf (Germany)
WASAG-CHEMIE AG., Essen (Germany)
WILLY THIELE, Celle b. Hannover (Germany)

EXPLOSIVES AND ACCESSORIES
DYNAMIT NOBEL AG., Troisdorf (Köln), Germany

EXPLOSION PROOF ELECTRICAL ENGINES
SIEMENS-SCHUCKERTWERKE AG., Berlin-Erlangen (Germany)

EXTRACTING PLANTS
HYDROCARBON MINERALÖL GMBH., Düsseldorf, Germany
CARL STILL, Recklinghausen i.W., Germany
FRIEDRICH UHDE GMBH., Dortmund (Germany)
B M A BRAUNSCHWEIGISCHE MASCHINENBAUANSTALT, Braunschweig, Germany
WILHELM SCHMIDDING, Köln-Niehl, Germany

FIRE BRICKS
DIDIER-WERKE AG., Essen, Germany
HEINRICH KOPPERS GMBH., Essen, Germany
CLAUDIUS PETERS AG., Hamburg, Germany

FIRE EXTINGUISHING EQUIPMENT
ALBACH & CO., Frankfurt/Main-Hoechst, Germany

FITTINGS (STEEL SEAMLESS WELDING) FOR THE PETROCHEMICAL, POWER & NUCLEAR INDUSTRY
TECNITUB ITALIANA, SpA Milano, Italia

FLOW CONTROLLER
G-S-T GESELLSCHAFT FÜR SELBSTTATIGE TEMPERATURREGELUNG mbH., Bochum-Riemke (Germany)

FLOW METER
MANNESMANN-EXPORT GMBH, Düsseldorf, Germany

FOAM MAKING EXTINGUISHERS
ALBACH & CO., Frankfurt, Main-Hoechst, West-Germany

FRACTIONATING PLANTS
DIDIER-WERKE AG., Essen, Germany
HYDROCARBON MINERALÖL GMBH., Düsseldorf, Germany
HEINRICH KOPPERS GMBH., Essen, Germany
CARL STILL, Recklinghausen i.W., Germany
FRIEDRICH UHDE GMBH., Dortmund (Germany)
MASCHINENFABRIK AUGSBURG-NÜRNBERG AG, Werk Gustavsburg, Germany
THEODOR GRABENER, Werthenbach Kr. Siegen, Germany
B M A BRAUNSCHWEIGISCHE MASCHINENBAUANSTALT, Braunschweig, Germany
WILHELM SCHMIDDING, Köln-Niehl, Germany

FURNACES
DIDIER-WERKE AG., Essen, Germany
HEINRICH KOPPERS GMBH., Essen, Germany
FRIEDRICH UHDE GMBH., Dortmund (Germany)
MANNESMANN-EXPORT GMBH, Düsseldorf, Germany
J. F. MAHLER, APPARATE-UND OFENBAU KG, Esslingen am Neckar, Germany

GAS CLEANING PLANTS
DIDIER-WERKE AG., Essen, Germany
HYDROCARBON MINERALÖL GMBH., Düsseldorf, Germany
HEINRICH KOPPERS GMBH., Essen, Germany
CARL STILL, Recklinghausen i.W., Germany
SULZER BROTHERS LTD., Winterthur (Switzerland)
FRIEDRICH UHDE GMBH., Dortmund (Germany)
MASCHINENFABRIK AUGSBURG-NÜRNBERG AG, Werk Gustavsburg, Germany
B M A BRAUNSCHWEIGISCHE MASCHINENBAUANSTALT, Braunschweig, Germany
J. F. MAHLER, APPARATE-UND OFENBAU KG, Esslingen am, Neckar, Germany

GAS COMPRESSORS
BORSIG AG, Berlin-Tegel, Germany
MANNESMANN-EXPORT GMBH, Düsseldorf, Germany
SULZER BROTHERS LTD., Winterthur (Switzerland)
MOTORENWERKE THOMASSEN N.V., De Steeg, Holland
MANNESMANN-MEER AG, Mönchengladbach, Germany

GAS ENGINES
MOTORENWERKE THOMASSEN N.V., De Steeg (Holland)

GAS ENGINE-COMPRESSORS
MOTORENWERKE THOMASSEN N.V., De Steeg (Holland)

GAS GENERATING PLANTS
DIDIER-WERKE AG., Essen, Germany
HYDROCARBON MINERALÖL GMBH., Düsseldorf, Germany
HEINRICH KOPPERS GMBH., Essen, Germany
CARL STILL, Recklinghausen i.W., Germany
MASCHINENFABRIK AUGSBURG-NÜRNBERG AG, Werk Gustavsburg, Germany
J. F. MAHLER, APPARATE-UND OFENBAU KG, Esslingen am, Neckar, Germany

GAS SEPARATION PLANTS
HYDROCARBON MINERALÖL GMBH., Düsseldorf, Germany
GESELLSCHAFT FÜR LINDE'S EISMASCHINEN AG., Höllriegelskreuth bei, München, Germany
CARL STILL, Recklinghausen i.W., Germany
FRIEDRICH UHDE GMBH., Dortmund (Germany)
MASCHINENFABRIK AUGSBURG-NÜRNBERG AG, Werk Gustavsburg, Germany
B M A BRAUNSCHWEIGISCHE MASCHINENBAUANSTALT, Braunschweig, Germany

GASOLINE RECOVERY PLANTS
DIDIER-WERKE AG., Essen, Germany
HYDROCARBON MINERALÖL GMBH., Düsseldorf, Germany
HEINRICH KOPPERS GMBH., Essen, Germany
CARL STILL, Recklinghausen i.W., Germany
FRIEDRICH UHDE GMBH., Dortmund (Germany)
MASCHINENFABRIK AUGSBURG-NÜRNBERG AG, Werk Gustavsburg, Germany

GAS STORAGE TANKS
ARBED, Dommeldange, Luxembourg
C.I.P.I.—COSTRUZIONI IMPIANTI PETROLIFERI INDUSTRIALI S.p.A., Venezia-Marghera (Italy)
BORSIG AG., Berlin-Tegel (Germany)
GUIDO SARTORI S.p.A., Venice (Italy)
THEODORE GRABENER, Werthenbach Kr. Siegen, Germany
MANNESMANN-EXPORT GMBH, Düsseldorf, Germany
MASCHINENFABRIK AUGSBURG-NÜRNBERG AG, Werk Gustavsburg, Germany
FRIEDRICH KOCKS, GMBH., Bremen, Germany

GAS TURBINES
ARBED, Dommeldange, Luxembourg
SIEMENS-SCHUCKERTWERKE AG., Berlin-Erlangen, (Germany)
SULZER BROTHERS LTD., Winterthur (Switzerland)
MOTORENWERKE THOMASSEN N.V., De Steeg, (Holland)

GATE VALVES
STAHL-ARMATUREN SIEPMANN GMBH. KG., Belecke (Mochne), Germany
MANNESMANN-EXPORT GMBH, Düsseldorf, Germany

GEAR UNITS
ARBED, Dommeldange, Luxembourg
HANIEL & LUEG GMBH., Düsseldorf (Germany)
LOHMANN & STOLTERFOHT AG, Witten, Ruhr, Germany
SALZGITTER MASCHINEN AKTIENGESELLSCHAFT SALZGITTER-BAD, Germany

GENERATORS
SIEMENS-SCHUCKERTWERKE AG., Berlin-Erlangen (Germany)
J. F. MAHLER, APPARATE-UND OFENBAU KG, Esslingen am Neckar, Germany

HEAT EXCHANGERS
HEINRICH KOPPERS GMBH., Essen, Germany
C.I.P.I. COSTRUZIONI IMPIANTI PETROLIFERI INDUSTRIALI S.p.A., Venezia-Marghera (Italy)
BORSIG AG., Berlin-Tegel (Germany)
PHOENIX-RHEINROHR AG., Düsseldorf (Germany)
REKUPERATOR K.G., Düsseldorf (Germany)
GUIDO SARTORI S..A., Venice (Italy)
FRIEDRICH UHDE GMBH., Dortmund (Germany)
GOTTFRIED BISCHOFF KG, Essen, Ruhr, Germany
THEODOR GRABENER, Werthenbach Kr. Siegen, Germany
MANNESMANN-EXPORT GMBH., Düsseldorf, Germany
MASCHINENFABRIK AUGSBURG-NÜRNBERG AG, Werk Gustavsburg, Germany
FRIEDRICH KOCKS GMBH., Bremen, Germany
B M A BRAUNSCHWEIGISCHE MASCHINENBAUANSTALT, Braunschweig, Germany

HEATERS
DIDIER-WERKE AG., Essen, Germany
CLAUDIUS PETERS AG., Hamburg 1, Germany
C.I.P.I. COSTRUZIONI IMPIANTI PETROLIFERI INDUSTRIALI S.p.A., Venezia-Marghera (Italy)
PHOENIX-RHEINROHR AG., Düsseldorf (Germany)
REKUPERATOR K.G., Düsseldorf (Germany)
GUIDO SARTORI S.p.A., Venice (Italy)
FRIEDRICH UHDE GMBH., Dortmund (Germany)
MASCHINENFABRIK AUGSBURG-NÜRNBERG AG, Werk Gustavsburg, Germany

HIGH PRESSURE APPARATUS
HEINRICH KOPPERS GMBH., Essen, Germany

C.I.P.I. COSTRUZIONI IMPIANTI PETROLIFERI INDUSTRIALI S.p.A., Venezia-Marghera (Italy)
BORSIG AG., Berlin-Tegel (Germany)
PHOENIX-RHEINROHR AG., Düsseldorf (Germany)
REKUPERATOR K.G., Düsseldorf (Germany)
GUIDO SARTORI S.p.A., Venice (Italy)
FRIEDRICH UHDE GMBH., Dortmund (Germany)
MASCHINENFABRIK AUGSBURG-NÜRNBERG AG, Werk Gustavsburg, Germany
THEODOR GRÄBENER, Werthenbach Kr. Siegen, Germany
MANNESMANN-EXPORT GMBH., Düsseldorf, Germany
FRIEDRICH KOCKS GMBH, Bremen, Germany
B M A BRAUNSCHWEIGISCHE MASCHINENBAUANSTALT, Braunschweig, Germany

HIGH PRESSURE PUMPS
SULZER BROTHERS LTD., Winterthur (Switzerland)
FRIEDRICH UHDE GMBH., Dortmund (Germany)
MANNESMANN-MEER AG, Mönchengladbach, Germany

HOISTS
ARBED, Dommeldange, Luxembourg
HANIEL & LUEG GMBH., Düsseldorf (Germany)
MANNESMANN-EXPORT GMBH, Düsseldorf, Germany
SALZGITTER MASCHINEN AKTIENGESELLSCHAFT, Salzgitter-Bad, Germany

HOISTING EQUIPMENT
ARBED, Dommeldange, Luxembourg
HANIEL & LUEG GMBH., Düsseldorf (Germany)
SALZGITTER MASCHINEN AKTIENGESELLSCHAFT, Salzgitter-Bad, Germany

HYDROFINING PLANTS FOR KEROSENE AND DIESEL OIL
HYDROCARBON MINERALÖL GMBH., Düsseldorf, Germany
HEINRICH KOPPERS GMBH., Essen, Germany
CARL STILL, Recklinghausen i.W., Germany
FRIEDRICH UHDE GMBH., Dortmund (Germany)
MASCHINENFABRIK AUGSBURG-NÜRNBERG AG, Werk Gustavsburg, Germany

HYDROGENATION OF HEAVY OILS AND RESIDUALS
HEINRICH KOPPERS GMBH., Essen, Germany
CARL STILL, Recklinghausen i.W., Germany
FRIEDRICH UHDE GMBH., Dortmund (Germany)
MASCHINENFABRIK AUGSBURG-NÜRNBERG AG, Werk Gustavsburg, Germany

INERT GAS GENERATORS
FRIEDRICH UHDE GMBH., Dortmund (Germany)
J. F. MAHLER, APPARATE-UND OFENBAU KG, Esslingen am Neckar, Germany

INSULATIONS
GRÜNZWEIG & HARTMANN AG., Ludwigshafen a.Rhein (Germany)
CLAUDIUS PETERS AG., Hamburg, Germany

INSULATION MATERIAL
GRÜNZWEIG & HARTMANN AG., Ludwigshafen a.Rhein (Germany)
CLAUDIUS PETERS AG., Hamburg, Germany

LEAD LININGS
MASCHINENFABRIK AUGSBURG-NÜRNBERG AG, Werk Gustavsburg, Germany

LIQUID LEVEL CONTROLLERS
G-S-T GESELLSCHAFT FÜR SELBSTTÄTIGE TEMPERATURREGELUNG mbH., Bochum-Riemke (Germany)

LIQUID LEVEL INDICATOR
CLAUDIUS PETERS AG., Hamburg, Germany

L.P.—GAS CONTAINERS
C.I.P.I. COSTRUZIONI IMPIANTI PETROLIFERI INDUSTRIALI S.p.A., Venezia-Marghera (Italy)
BORSIG AG., Berlin-Tegel (Germany)
GUIDO SARTORI S.p.A., Venice (Italy)
MASCHINENFABRIK AUGSBURG-NÜRNBERG AG, Werk Gustavsburg, Germany
MANNESMANN-EXPORT GMBH, Düsseldorf, Germany
THEODOR GRÄBENER, Werthenbach Kr. Siegen, Germany

L.P.—GAS FILLING STATIONS
CARL STILL, Recklinghausen i.W., Germany
BORSIG AG., Berlin-Tegel (Germany)
MANNESMANN-EXPORT GMBH, Düsseldorf, Germany
MASCHINENFABRIK AUGSBURG-NÜRNBERG AG, Werk Gustavsburg, Germany

MEASURING AND CONTROL INSTRUMENTS
DEGUSSA, Hanau, Germany
HEINRICH KOPPERS GMBH., Essen, Germany
G-S-T GESELLSCHAFT FÜR SELBSTTÄTIGE TEMPERATURREGELUNG mbH., Bochum-Riemke (Germany)
GESELLSCHAFT FÜR AUTOMATION mbH., Essen (Germany)
SIEMENS-SCHUCKERTWERKE AG., Berlin-Erlangen (Germany)

MONITORS (FOR WATER AND FOAM MAKING)
ALBACH & CO., Frankfurt/Main-Hoechst, W-Germany

MOTORS, ELECTRIC, FLAMEPROOF
SIEMENS-SCHUCKERTWERKE AG., Berlin-Erlangen (Germany)

NATURAL GAS PRODUCTION
C. DEILMANN BERGBAU GMBH., Bentheim, Germany

NATURAL GAS SPLITTING PLANTS
DIDIER-WERKE AG., Essen, Germany
HYDROCARBON MINERALÖL GMBH., Düsseldorf, Germany
CARL STILL, Recklinghausen i.W., Germany
FRIEDRICH UHDE GMBH., Dortmund (Germany)
MASCHINENFABRIK AUGSBURG-NÜRNBERG AG, Werk Gustavsburg, Germany

NUTS, ACID PROOF, RUST PROOF, REFRACTORY
DIDIER-WERKE AG., Essen, Germany

OIL BURNERS
HEINRICH KOPPERS GMBH., Essen, Germany
CLAUDIUS PETERS AG., Hamburg, Germany
SULZER BROTHERS LTD., Winterthur (Switzerland)

OIL EXTRACTION PLANTS
FRIEDRICH UHDE GMBH., Dortmund (Germany)
MASCHINENFABRIK AUGSBURG-NÜRNBERG AG, Werk Gustavsburg, Germany
B M A BRAUNSCHWEIGISCHE MASCHINANBAUANSTALT, Braunschweig, Germany

OIL SHALE RETORTING
DIDIER-WERKE AG., Essen, Germany

OIL WELL PUMPS
HANIEL & LUEG GMBH., Düsseldorf (Germany)
MOTORENWERKE THOMASSEN N.V., De Steeg (Holland)
SALZGITTER MASCHINEN AKTIENGESELLSCHAFT, Salzgitter-Bad, Germany

OXYGEN PLANTS
HYDROCARBON MINERALÖL GMBH., Düsseldorf, Germany
GESELLSCHAFT FÜR LINDE'S EISMASCHINEN AG., Höllriegelskreuth bei München, Germany

PETROCHEMICAL PLANTS
HYDROCARBON MINERALÖL GMBH., Düsseldorf, Germany
CARL STILL, Recklinghausen i.W., Germnay
FRIEDRICH UHDE GMBH., Dortmund (Germany)
MANNESMANN-ROHRLEITUNGSBAU GMBH., Düsseldorf, Germany
MASCHINENFABRIK AUGSBURG-NÜRNBERG AG, Werk Gustavsburg, Germany
B M A BRAUNSCHWEIGISCHE MASCHINANBAUANSTALT, Braunschweig, Germany

PIPES
COMPTOIR FRANCO BELGE D'EXPORTATION DES TUBES D'ACIER, Neuilly-sur-Seine (France)
PHOENIX-RHEINROHR AG., Düsseldorf (Germany)
N.V. "RIJNSTAAL," Arnhem (Holland)
MANNESMANN-EXPORT GMBH, Düsseldorf, Germany
MASCHINENFABRIK AUGSBURG-NÜRNBERG AG, Werk Gustavsburg, Germany
HOESCH AKTIENGESELLSCHAFT, Dortmund, Germany

PIPE BENDS
PHOENIX-RHEINROHR AG., Düsseldorf (Germany)
MANNESMANN-EXPORT GMBH, Düsseldorf, Germany
HOESCH AKTIENGESELLSCHAFT, Dortmund, Germany

PIPE LINES
C.I.P.I., COSTRUZIONI IMPIANTI PETROLIFERI INDUSTRIALI S.p.A., Venezia-Marghera (Italy)
COMPTOIR FRANCO BELGE D'EXPORTATION DES TUBES D'ACIER, Neuilly-sur-Seine (France)
GUIDO SARTORI S.p.A., Venice (Italy)
SULZER BROTHERS LTD., Winterthur (Switzerland)
THEODOR GRÄBENER, Werthenbach Kr. Siegen, Germany
MANNESMANN-ROHRLEITUNGSBAU GMBH., Düsseldorf, Germany
MANNESMANN-EXPORT GMBH, Düsseldorf, Germany
FRIEDRICH KOCKS GMBH., Bremen, Germany
HOESCH AKTIENGESELLSCHAFT, Dortmund, Germany

PIPE LINE CONSTRUCTION UNDER WATER
C.I.P.I., COSTRUZIONI IMPIANTI PETROLIFERI INDUSTRIALI S.p.A., Venezia-Marghera (Italy)
GUIDO SARTORI S.p.A., Venice (Italy)
MANNESMANN-EXPORT GMBH, Düsseldorf, Germany
MANNESMANN-ROHRLEITUNGSBAU GMBH., Düsseldorf, Germany

PIPE LINES INSULATION
GRÜNZWEIG & HARTMANN A.G., Ludwigshafen am Rhein, Germany

PIPES SPIRAL WELDED
SALZGITTER STAHLBAU GMBH, Salzgitter-Watenstedt, Germany

PIPE SYSTEMS
DIDIER-WERKE AG., Essen, Germany
CARL STILL, Recklinghausen i.W., Germany
C.I.P.I. COSTRUZIONI IMPIANTI PETROLIFERI INDUSTRIAL S.p.A., Venezia-Marghera (Italy)
PHOENIX-RHEINROHR AG., Düsseldorf (Germany)
GUIDO SARTORI S.p.A., Venice (Italy)
MASCHINENFABRIK AUGSBURG-NÜRNBERG AG, Werk Gustavsburg, Germany
MANNESMANN-EXPORT GMBH, Düsseldorf, Germany
MANNESMANN-ROHRLEITUNGSBAU GMBH, Düsseldorf, Germany

POWER-PLANTS
DIDIER-WERKE AG., Essen, Germany
BORSIG AG., Berlin-Tegel (Germany)
MOTOREN-WERKE MANNHEIM AG., Mannheim (Germany)
SIEMENS-SCHUCKERTWERKE AG., Berlin-Erlangen (Germany)
SULZER BROTHERS LTD., Winterthur (Switzerland)
GRÜNZWEIG & HARTMANN A. G. Ludwigshafen am Rhein Germany
FRANZ SEIFFERT & CO. AG, Berlin-Grunewald, Germany
MANNESMANN-ROHRLEITUNGSBAU GMBH, Düsseldorf, Germany
KLÖCKNER-HUMBOLDT-DEUTZ AG, Werk ulm, Ulm, Donau Germany
DAIMLER-BENZ AG., Stuttgart-Untertürkheim, Germany

PREFABRICATED HOUSES
ETS. LOUIS ZHENDRE, Begles (Gironde), France

PRESSURE CONTROLLERS
G-S-T GESELLSCHAFT FÜR SELBSTTÄTIGE TEMPERATURREGELUNG MBH., Bochum-Riemke (Germany)

PRESSURE VESSELS
C.I.P.I. COSTRUZIONI IMPIANTI PETROLIFERI INDUSTRALI S.p.A., Venezia-Marghera (Italy)
BORSIG AG., Berlin-Tegel (Germany)
PHOENIX-RHEINROHR AG., Düsseldorf (Germany)
GUIDO SARTORI S.p.A., Venice (Italy)
SULZER BROTHERS LTD., Winterthur (Switzerland)
THEODOR GRÄBENER, Werthenbach Kr. Siegen, Germany
MASCHINENFABRIK AUGSBURG-NÜRNBERG AG, Werk Gustavsburg, Germany
MANNESMANN-EXPORT GMBH, Düsseldorf, Germany
FRIEDRICH KOCKS GMBH., Bremen, Germany

PROPORTIONATING PUMPS FOR LIQUIDS AND GASES
FRIEDRICH UHDE GMBH., Dortmund (Germany)

PROPANE RECOVERY PLANTS
HYDROCARBON MINERALÖL GMBH, Düsseldorf, Germany
HEINRICH KOPPERS GMBH., Essen, Germany
CARL STILL, Recklinghausen i.W., Germany
FRIEDRICH UHDE GMBH., Dortmund (Germany)
MASCHINENFABRIK AUGSBURG-NÜRNBERG AG, Werk Gustavsburg, Germany

PROPANE STORAGE VESSELS
CARL STILL, Recklinghausen i.W., Germany
BORSIG AG., Berlin-Tegel (Germany)
GUIDO SARTORI S.p.A., Venice (Italy)
MASCHINENFABRIK AUGSBURG-NÜRNBERG AG, Werk Gustavsburg, Germany
THEODOR GRÄBENER, Werthenbach Kr. Siegen, Germany
MANNESMANN-EXPORT GMBH, Düsseldorf, Germany
FRIEDRICH KOCKS GMBH., Bremen, Germany

PUMPS
HANIEL & LUEG GMBH., Düsseldorf (Germany)
SULZER BROTHERS LTD., Winterthur (Switzerland)
SALZGITTER MASCHINEN AKTIENGESELLSCHAFT, Salzgitter-Bad, Germany

PUMPING UNITS
DIDIER-WERKE AG., Essen, Germany
HYDROCARBON MINERALÖL GMBH, Düsseldorf, Germany
HANIEL & LUEG GMBH., Düsseldorf (Germany)
MOTORENWERKE THOMASSEN N.V., De Steeg (Holland)
MOTOREN-WERKE MANNHEIM AG., Mannheim (Germany)
DAIMLER-BENZ AG, Stuttgart-Untertürkheim, Germany
SALZGITTER MASCHINEN AKTIENGESELLSCHAFT, Salzgitter-Bad, Germany

REACTORS
C.I.P.I. COSTRUZIONI IMPIANTI PETROLIFERI INDUSTRIALI S.p.A., Venezia-Marghera (Italy)
BORSIG AG., Berlin-Tegel (Germany)
GUIDO SARTORI S.p.A., Venice (Italy)
SULZER BROTHERS LTD., Winterthur (Switzerland)
THEODOR GRÄBENER, Werthenbach Kr. Siegen, Germany
MASCHINENFABRIK AUGSBURG-NÜRNBERG AG, Werk Gustavsburg, Germany
MANNESMANN-EXPORT GMBH, Düsseldorf, Germany

RECUPERATORS
C.I.P.I. COSTRUZIONI IMPIANTI PETROLIFERI INDUSTRIALI S.p.A., Venezia-Marghera (Italy)
REKUPERATOR K.G. Düsseldorf (Germany)
GUIDO SARTORI S.p.A., Venice (Italy)
THEODOR GRÄBENER, Werthenbach Kr. Siegen, Germany
MASCHINENFABRIK AUGSBURG-NÜRNBERG AG, Werk Gustavsburg, Germany

REFINING PLANTS
DIDIER-WERKE AG., Essen, Germany
HYDROCARBON MINERALÖL GMBH, Düsseldorf, Germany
HEINRICH KOPPERS GMBH., Essen, Germany
CARL STILL, Recklinghausen i.W., Germany
FRIEDRICH UHDE GMBH., Dortmund (Germany)
GRÜNZWEIG & HARTMANN AG, Ludwigshafen, Rhein

MANNESMANN-ROHRLEITUNGSBAU GMBH, Düsseldorf, Germany
MASCHINENFABRIK AUGSBURG-NÜRNBERG AG, Werk Gustavsburg, Germany

REFINERY UNITS AND EQUIPMENT
DIDIER-WERKE AG., Essen, Germany
HYDROCARBON MINERALÖL GMBH. Düsseldorf, Germany
HEINRICH KOPPERS GMBH., Essen, Germany
CARL STILL, Recklinghausen i.W., Germany
FRIEDRICH UHDE GMBH., Dortmund (Germany)
MANNESMANN-EXPORT GMBH, Düsseldorf, Germany
MASCHINENFABRIK AUGSBURG-NÜRNBERG AG, Werk Gustavsburg, Germany

RETURN BENDS
PHOENIX-RHEINROHR AG., Düsseldorf (Germany)
MANNESMANN-EXPORT GMBH, Düsseldorf, Germany

REFORMING PLANTS
DIDIER-WERKE AG., Essen, Germany
HYDROCARBON MINERALÖL GMBH. Düsseldorf, Germany
HEINRICH KOPPERS GMBH., Essen, Germany
CARL STILL, Recklinghausen i.W., Germany
FRIEDRICH UHDE GMBH., Dortmund (Germany)
MASCHINENFABRIK AUGSBURG-NÜRNBERG AG, Werk Gustavsburg, Germany
J. F. MAHLER, APPARATE-UND OFENBAU KG, Esslingen am Neckar, Germany

REFRIGERATING EQUIPMENT
ETS. LOUIS ZHENDRE, Begles (Gironde), France

REFRIGERATING PLANTS
HYDROCARBON MINERALÖL GMBH. Düsseldorf, Germany
BORSIG AG., Berlin-Tegel (Germany)
SULZER BROTHERS LTD., Winterthur (Switzerland)
GRÜNZWEIG & HARTMANN AG, Ludwigshafen am Rhein (Germany)
GOTTFRIED BISCHOFF KG, Essen, Ruhr, Germany

ROTARY DEEP DRILLING UNITS
HANIEL & LUEG GMBH., Düsseldorf (Germany)
SALZGITTER MASCHINEN AKTIENGESELLSCHAFT, Salzgitter-Bad, Germany

SCREEN PIPE
MOTORENWERKE THOMASSEN N.V., De Steeg (Holland)

SCREENING UNITS
SALZGITTER MASCHINEN AKTIENGESELLSCHAFT, Salzgitter-Bad, Germany

SEISMIC EXPLOSIVES
WASAG-CHEMIE AG., Essen (Germany)

SEISMIC FIELD WORK
C. DIELMANN BERGBAU GMBH., Bentheim, Germany

SLOTTED CASING
MOTORENWERKE THOMASSEN N.V., De Steeg (Holland)

SPECIAL ALLOYS STEEL
ARBED, DOMMELDANGE, Luxembourg
PHOENIX-RHEINROHR AG., Düsseldorf (Germany)
MANNESMANN-EXPORT GMBH, Düsseldorf, Germany
HOESCH AKTIENGESELLSCHAFT, Fortmund, Germany

SPHERICAL TANKS
C.I.P.I. COSTRUZIONI IMPIANTI PETROLIFERI INDUSTRIALI S.p.A., Venezia-Marghera (Italy)
GUIDO SARTORI S.p.A., Venice (Italy)
THEODOR GRÄBENER, Werthenbach Kr. Siegen, Germany
MASCHINENFABRIK AUGSBURG-NÜRNBERG AG, Werk Gustavsburg, Germany
MANNESMANN-EXPORT GMBH, Düsseldorf, Germany
FRIEDRICH KOCKS GMBH., Bremen, Germany

STABILISERS
HEINRICH KOPPERS GMBH., Essen, Germany
CARL STILL, Recklinghausen i.W., Germany
C.I.P.I. COSTRUZIONI IMPIANTI PETROLIFERI INDUSTRIALI S.p.A., Venezia-Marghera (Italy)
GUIDO SARTORI S.p.A., Venice (Italy)
FRIEDRICH UHDE GMBH., Dortmund (Germany)
CHEMISCHE WERKE HUELS AG, Marl Kr. Recklinghausen, Germany
MASCHINENFABRIK AUGSBURG-NÜRNBERG AG, Werk Gustavsburg, Germany

STEAM POWER PLANTS
DIDIER-WERKE AG., Essen, Germany
HYDROCARBON MINERALÖL GMBH. Düsseldorf, Germany
BORSIG AG., Berlin-Tegel (Germany)
SULZER BROTHERS LTD., Winterthur (Switzerland)
MANNESMANN-ROHRLEITUNGSBAU GMBH, Düsseldorf, Germany

STEAM TRAPS
SIEMENS-SCHUCKERTWERKE AG., Berlin-Erlangen (Germany)

STEAM TURBINES
ARBED, DOMMELDANGE, Luxembourg
BORSIG AG., Berlin-Tegel (Germany)
SIEMENS-SCHUCKERTWERKE AG., Berlin-Erlangen Germany
SULZER BROTHERS LTD., Winterthur (Switzerland)

STEEL CONSTRUCTIONS
ARBED, DOMMELDANGE, Luxembourg
C.I.P.I. COSTRUZIONI IMPIANTI PETROLIFERI INDUSTRIALI S.p.A., Venezia-Marghera (Italy)
PHOENIX-RHEINROHR AG., Düsseldorf (Germany)
GUIDO SARTORI S.p.A., Venice (Italy)
GOTTFRIED BISCHOFF KG, Essen, Ruhr, Germany
MANNESMANN-EXPORT GMBH, Düsseldorf, Germany
THEODOR GRÄBENER, Werthenbach Kr. Siegen, Germany
MASCHINENFABRIK AUGSBURG-NÜRNBERG AG, Werk Gustavsburg, Germany
SALZGITTER MASCHINEN AKTIENGESELLSCHAFT, Salzgitter-Bad, Germany

SULFURIC ACID PLANTS
HEINRICH KOPPERS GMBH., Essen, Germany
CARL STILL, Recklinghausen i.W., Germany
MASCHINENFABRIK AUGSBURG-NÜRNBERG AG, Werk Gustavsburg, Germany
THEODOR GRÄBENER, Werthenbach Kr. Siegen, Germany

SULFUR RECOVERY PLANTS
HEINRICH KOPPERS GMBH., Essen, Germany
CARL STILL, RECKLINGHAUSEN i.W., Germany
FRIEDRICH UHDE GMBH., Dortmund (Germany)
GOTTFRIED BISCHOFF KG, Essen, Ruhr, Germany
MASCHINENFABRIK AUGSBURG-NÜRNBERG AG, Werk Gustavsburg, Germany

TANKS FOR L.P.G.
CARL STILL, Recklinghausen i.W., Germany
C.I.P.I. COSTRUZIONI IMPIANTI PETROLIFERI INDUSTRIALI S.p.A., Venezia-Marghera (Italy)
BORSIG AG., Berlin-Tegel (Germany)
GUIDO SARTORI S.p.A., Venice (Italy)
MASCHINENFABRIK AUGSBURG-NÜRNBERG AG, Werk Gustavsburg, Germany
GOTTFRIED BISCHOFF KG, Essen, Ruhr, Germany
THEODOR GRÄBENER, Werthenbach Kr. Siegen, Germany
MANNESMANN-EXPORT GMBH, Düsseldorf, Germany
FRIEDRICH KOCKS GMBH., Bremen, Germany

TANK CARS AND PORTABLE CONTAINERS
BORSIG AG., Berlin-Tegel (Germany)

TANK HEATING EQUIPMENT
DIDIER-WERKE AG., Essen, Germany
C.I.P.I. COSTRUZIONI IMPIANTI PETROLIFERI INDUSTRIALI S.p.A., Venezia-Marghera (Italy)
GUIDO SARTORI S.p.A., Venice (Italy)
FRIEDRICH KOCKS GMBH., Bremen, Germany

TEMPERATURE CONTROLLERS
G-S-T GESELLSCHAFT FÜR SELBSTTÄTIGE TEMPERATURREGELUNG mbH., Bochum-Riemke (Germany)

TELEMETERING INSTRUMENTS
G-S-T GESELLSCHAFT FÜR SELBSTTÄTIGE TEMPERATURREGELUNG mbH., Bochum-Riemke (Germany)

THERMOMETERS
DEGUSSA, Hanau, Germany

TRANSFORMERS, FLAMEPROOF
SIEMENS-SCHUCKERTWERKE AG., Berlin-Erlangen Germany

TRANSMITTERS
G-S-T GESELLSCHAFT FÜR SELBSTTÄTIGE TEMPERATURREGELUNG mbH., Bochum-Riemke (Germany)

TUBES
ARBED, DOMMELDANGE, Luxembourg
BORSIG AG., Berlin-Tegel (Germany)
COMPTOIR FRANCO BELGE D'EXPORTATION DES TUBES D'ACIER, Neuilly-sur-Seine (France)
PHOENIX-RHEINROHR AG., Düsseldorf (Germany)
N.V. "RIJNSTAAL", Arnhem (Holland)
MANNESMANN-EXPORT GMBH, Düsseldorf, Germany
HOESCH AKTIENGESELLSCHAFT, Dortmund, Germany

TUBES, FINNED
PHOENIX-RHEINROHR AG., Düsseldorf (Germany)
FRIEDRICH UHDE GMBH., Dortmund (Germany)
MANNESMANN-EXPORT GMBH, Düsseldorf, Germany
HOESCH AKTIENGESELLSCHAFT, Dortmund, Germany

TURBINES
ARBED, DOMMELDANGE, Luxembourg
BORSIG AG., Berlin-Tegel (Germany)
SIEMENS-SCHUCKERTWERKE AG., Berlin-Erlangen (Germany)

TURBINE DRILLING
HANIEL & LUEG GMBH., Düsseldorf (Germany)
SALZGITTER MASCHINEN AKTIENGESELLSCHAFT, Salzgitter-Bad, Germany

VALVES—TANK-CAR, PRESSURE-RELIEF
MOTORENWERKE THOMASSEN N.V., De Steeg (Holland)

VALVES
STAHL-ARMATUREN SIEPMANN GMBH. KG, Belecke (Moehne), Germany
MANNESMANN-EXPORT GMBH, Düsseldorf, Germany
BOPP & REUTHER GMBH, Mannhaim-Waldhof, Germany

VACUUM PLANTS
CARL STILL, Recklinghausen i.W., Germany
MASCHINENFABRIK AUGSBURG-NÜRNBERG AG, Werk Gustavsburg, Germany
B M A BRAUNSCHWEIGISCHE MASCHINENBAUANSTALT Braunschweig, Germany

VENTILATORS
SIEMENS-SCHUCKERTWERKE AG., Berlin-Erlangen (Germany)
SULZER BROTHERS LTD., Winterthur (Switzerland)

VESSELS
C.I.P.I. COSTRUZIONI IMPIANTI PETROLIFERI INDUSTRIALI S.p.A., Venezia-Marghera (Italy)
BORSIG AG., Berlin-Tegel (Germany)
PHOENIX-RHEINROHR AG., Düsseldorf (Germany)
GUIDO SARTORI S.p.A., Venice (Italy)
MASCHINENFABRIK AUGSBURG-NÜRNBERG AG, Werk Gustavsburg, Germany
MANNESMANN-EXPORT GMBH, Düsseldorf, Germany
THEODOR GRÄBENER, Werthenbach Kr. Siegen, Germany
B M A BRAUNSCHWEIGISCHE MASCHINENBAUANSTALT Braunschweig, Germany

WASHING COLUMNS
CARL STILL, Recklinghausen i.W., Germany
C.I.P.I. COSTRUZIONI IMPIANTI PETROLIFERI INDUSTRIALI S.p.A., Venezia-Marghera (Italy)
BORSIG AG., Berlin-Tegel (Germany)
PHOENIX-RHEINROHR AG., Düsseldorf (Germany)
GUIDO SARTORI S.p.A., Venice (Italy)
FRIEDRICH UHDE GMBH., Dortmund (Germany)

GOTTFRIED BISCHOFF KG, Essen, Ruhr, Germany
THEODOR GRÄBENER, Werthenbach Kr. Siegen, Germany
MASCHINENFABRIK AUGSBURG-NÜRNBERG AG, Werk Gustavsburg, Germany
B M A BRAUNSCHWEIGISCHE MASCHINENBAUANSTALT Braunschweig, Germany
WILHELM SCHMIDDING, Köln-Niehl, Germany

WATER CANNONS
ALBACH & CO., Frankfurt, Main-Hoechst, West-Germany

WATER PROCESSING PLANTS
CARL STILL, Recklinghausen i.W., Germany
MASCHINENFABRIK AUGSBURG-NÜRNBERG AG, Werk Gustavsburg, Germany
GOTTFRIED BISCHOFF KG, Essen, Ruhr, Germany

WELL CEMENT
ITALCEMENTI, Bergamo, Italia

WELL HEAD EQUIPMENTS
CELLER MASCHINENFABRIK GEBRÜDER SCHÄFER, Celle, Germany

WIRE ROPES
HOESCH AKTIENGESELLSCHAFT, Dortmund, Germany

Extra Copies of World Petroleum Report 1961 Are Available

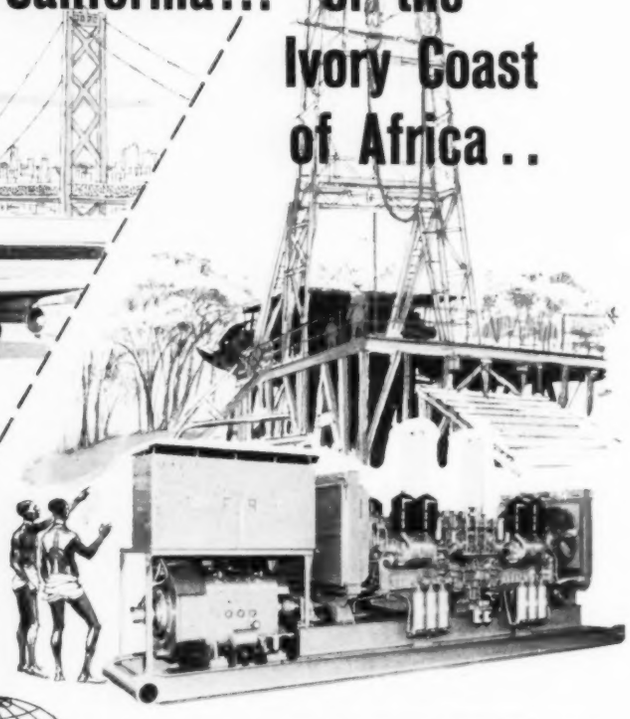
A Limited number of extra copies of World Petroleum Report 1961 are available at $10 per copy. For reference work or library use some have been bound in hard covers and gold stamped. These are also available at $15 per copy.

Address orders to: Order Department,

World Petroleum Report, 25 West 45th St., New York 36, New York.

In San Francisco, California... or the Ivory Coast of Africa..

Stewart & Stevenson Self-Propelled, diesel powered, Airport Utility Unit providing electric power for a giant Boeing 707 Jet Liner.



Stewart & Stevenson RIGELECTRIC engine electric power unit supplying power for drilling operations on Laughlin Porter's oil drilling rig in Africa.

STEWART & STEVENSON

When it comes to diesel or gas engine power, Stewart & Stevenson experience and "know-how" have no boundaries.

Here again are two diesel engine power applications . . . in direct contrast and in opposite parts of the world . . . with one important characteristic in common: both were designed and built by Stewart & Stevenson Services, the world's largest distributor of diesel engines. Both power applications are serving vital industries where thousands of dollars and valuable contracts are totally dependent on the reliability and performance of this engine driven equipment.

When you need power . . . for any application in any part of the world . . . Stewart & Stevenson's experience, service organization and engineering will guarantee dependable performance. We will be glad to study your power needs and submit recommendations. Please write for additional information.

STEWART & STEVENSON

STEWART & STEVENSON SERVICES, INC.

Main Office and Plant: 4516 Harrisburg Blvd., Houston 11, Texas
Phone: CApitol 5-5341
Branches: Corpus Christi, Dallas, Lubbock, San Juan, San Antonio, Beaumont, Odessa
Representatives: Longview, Brownsville, Witchita Falls, Freeport
Export: Room 1405, 74 Trinity Place, New York, N. Y.

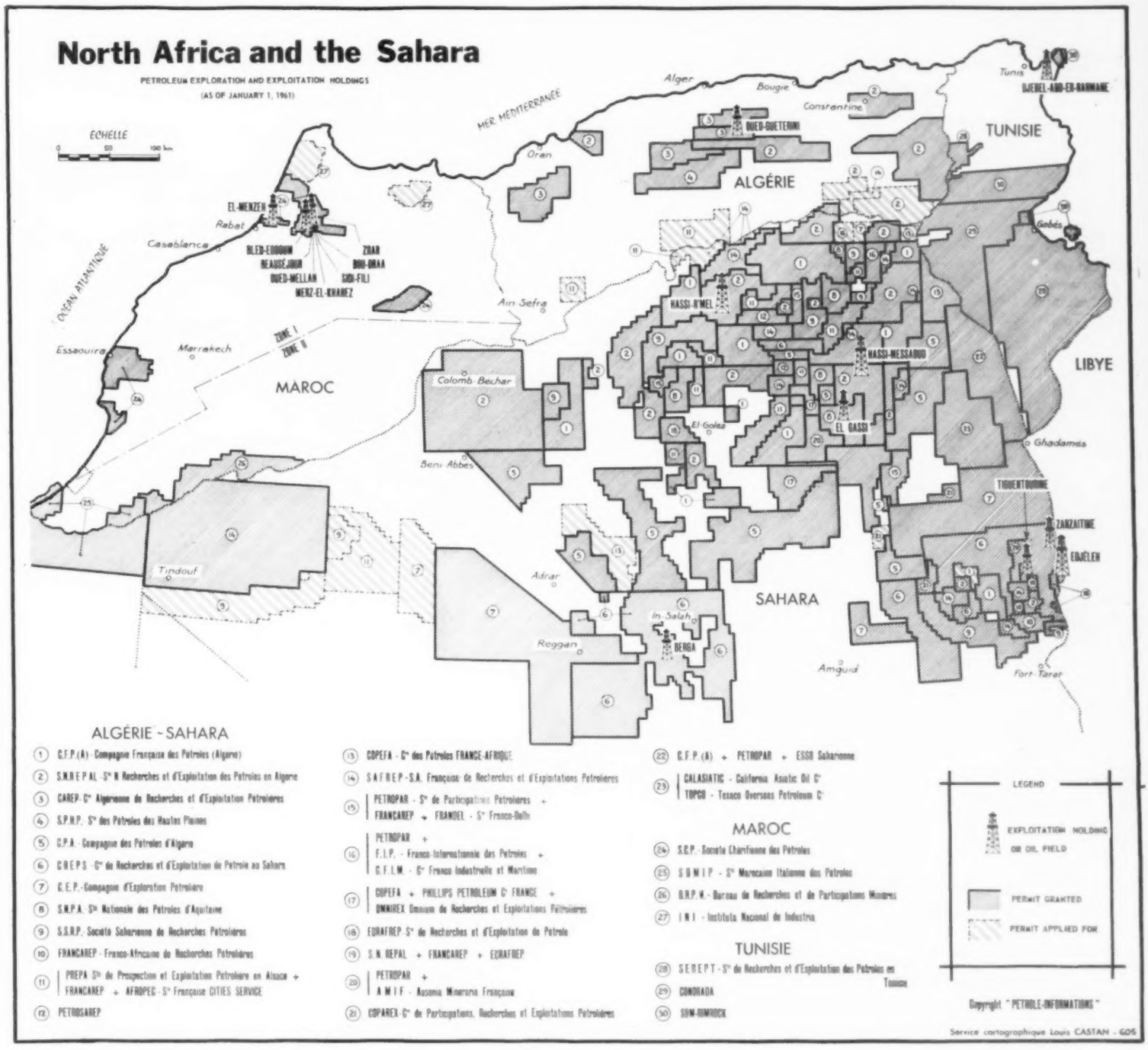
THE WORLD'S LARGEST DISTRIBUTOR OF DIESEL ENGINES

NORTH AFRICA

In the short space of five years, North Africa has seen a spectacular development in oil. Exploration has been confined principally to Algeria and Libya, but is spreading slowly, both east and west, to Egypt's Western Desert on the east and to Morocco and the Spanish Sahara on the west.

Investment in North Africa has been high. By the end of 1960, investment in Libya and Algeria alone had reached about $2.5 billion—much of it in exploration, but considerable amounts have been invested in transportation and production as well.

Many comparisons have been made between the Middle East and North Africa, particularly since the two areas are in competition for the European crude market. North Africa has a geographical advantage in respect to European markets. Hassi Messaoud is about 400 miles from its Mediterranean terminal at Bougie, compared with Kirkuk's 550 miles and Abqaiq's 1,000 miles. Bougie is only 400 miles from Marseilles as against 4,800 miles from the head of the Persian (Arabian) Gulf. Zelten is 100 miles from Marsael Brega on the Gulf of Sirte, which is 600 miles east of Skirra, and is about 1,000 miles from Marseilles.



ALGÉRIE - SAHARA

1. C.F.P.(A) - Compagnie Française des Pétroles (Algerie)
2. S.N.R.E.P.AL. - S^te N Recherches et d'Exploitation des Pétroles en Algerie
3. CAREP - C^ie Algerienne de Recherches et d'Exploitation Pétrolieres
4. S.P.N.P. - S^te des Pétroles des Hautes Plaines
5. C.P.A. - Compagnie des Pétroles d'Algerie
6. C.R.E.P.S. - C^ie de Recherches et d'Exploitation de Pétrole au Sahara
7. C.E.P. - Compagnie d'Exploration Pétrolière
8. S.N.P.A. - S^te Nationale des Pétroles d'Aquitaine
9. S.S.R.P. - Société Saharienne de Recherches Pétrolières
10. FRANCAREP - Franco-Africaine de Recherches Pétrolières
11. PREPA S^te de Prospection et Exploitation Pétrolière en Alsace + FRANCAREP + AFROPEC - S^te Française CITIES SERVICE
12. PETROSAREP
13. COPEFA - C^ie des Pétroles FRANCE-AFRIQUE
14. SAFREP - S.A. Française de Recherches et d'Exploitations Pétrolieres
15. PETROPAR - S^te de Participations Pétrolieres + FRANCAREP + FRANDEL - S^te Franco-Belge
16. PETROPAR + F.I.P. - Franco-Internationale des Pétroles + C.F.I.M. - C^ie Franco Industrielle et Maritime
17. COPEFA + PHILLIPS PETROLEUM C^ie FRANCE + OMNIREX Omnium de Recherches et Exploitations Pétrolieres
18. EURAFREP S^te de Recherches et d'Exploitation de Pétrole
19. S.N. REPAL + FRANCAREP + EURAFREP
20. PETROPAR + A.M.I.F. - Ausonia Mineraria Française
21. COPAREX C^ie de Participations, Recherches et Exploitations Pétrolieres
22. C.F.P.(A) + PETROPAR + ESSO Saharienne
23. CALASIATIC - California Asiatic Oil C^ie + TOPCO - Texaco Overseas Petroleum C^ie

MAROC

24. S.C.P. - Société Chérifienne des Pétroles
25. S.O.M.I.P. - S^te Marocaine Italienne des Pétroles
26. B.R.P.M. - Bureau de Recherches et de Participations Minières
27. I.N.I. - Instituto Nacional de Industria

TUNISIE

28. SEREPT - S^te de Recherches et d'Exploitation des Pétroles en Tunisie
29. CONDRADA
30. SIM-REMOREX

LEGEND
EXPLOITATION HOLDING OR OIL FIELD
PERMIT GRANTED
PERMIT APPLIED FOR

Copyright "PETROLE-INFORMATIONS"
Service cartographique Louis CASTAN - GDS

LIBYA

EXPLORATION: Drilling rigs active in Libya total 35 and, as of November 1, 1960, a total of 163 wells had been drilled; 47 were oil producers, five were gas producers, and 111 were dry holes. By January 1, 1961, there were 63 oil producers. The tested rate of production, measured in barrels per day, was 107,137 on January 1, 1961; but no production will be under way until completion of pipeline facilities by Esso, which will deliver oil to the coast sometime late in 1961 or early in 1962, and by Oasis Oil Co., which has a similar project to deliver oil to the coast during the first half of 1962.

The Libyan government issued a summary of developments through mid-1960, entitled "Petroleum Development in Libya—1954 Through Mid-1960." It reviews operations since the first concession grant in November 1955.

Concessions granted at present include 19 companies, of which 12 are American, one British, one Anglo-Dutch (Shell group), two German, two Italian, and one French. Six marine concessions have been granted: to Atlantic, Texaco-California, and Gulf.

In addition to the work done under the concession areas, most companies renew their reconnaissance permits yearly. These permits, under which geophysical work may be done (except seismic), enables them to make surveys outside the borders of their concessions for information on surrendered areas, and better geological understanding of their concession areas.

Total expenditures reported by the oil companies to the midpoint of 1960 was US$369,600,000, equivalent to 132 million Libyan pounds. The number of persons employed had risen to 9,150 in oil, of which 6,300 were Libyans. Cumulative seismic work (in party-months) was 938; gravity and magnetic party-months totaled 624, and geological 1,414. Rig-months were 518 at the mid-1960 point.

Geology: Cambrian and Ordovician sandstones and quartzites cover most of Libya. Western Libya is divided into two distinct basins: the Gadames (on the northwest) and Mourzouk (southwest), both containing Paleozoic sediments primarily.

Libya is geologically divided by a north-south Silurian trend from Tibesti through Gargaf to Garian. East of this trend, some early Paleozoic sediments are present, particularly in the Kufra Basin. Eastern Libya's main area of interest is the Cretaceous-Paleocene basin near the Gulf of Sirte.

Cost of a seismograph crew runs about $2,800 per day, and a drilling rig about $7,000. Distances are considerable, and climatic conditions quite severe, especially in the summer. Operations in the Gulf of Sirte area, which is considered to be relatively accessible, are about 500 to 600 miles from the base of operations in Tripoli. All material, except perishable foods and personnel, are trucked into the locations at substantial cost. Personnel and perishable foods are transported by charter aircraft, a drilling rig requiring two trips of a DC-3 per week.

New Companies in Libya: A number of new companies are in Libya awaiting the grants of concessions on areas to be surrendered. At last count, the companies were as follows: (1) Pure Oil, agents for Tidewater, Union, Sun, Skelly, and Ashland Refining. (The latter two companies have a 10% interest each); (2) Kerr-McGee, agents also for Felmont, Champlin, and Cabot Carbon; (3) Superior Oil; (4) Cities Service-Richfield; (5) D. D. Feldman-Crown Central-Kewanee, and a refining cooperative with headquarters in Kansas City. Johnson Bennett, former Esso manager in Libya, is representing them. A USA company called Libyan Desert Oil Co. has been incorporated, and is being registered in Libya; (6) Libyan-Texas. According to available information, this includes Clark Refining (supposed to be controlled by DuPont) and some Dallas interests; (7) Midwest Oil, and Texas Pacific Coal & Oil. Their representatives returned to the USA for consultation with their principals to decide whether to actively seek concessions; (8) Sinclair; (9) Canadian Delhi; (10) Phillips Oil.

C. Deilman, the German company, and a Japanese group (supposedly the same as in the Neutral Zone offshore area) have made inquiries.

The most important operational development during 1960 was the Marsa el Brega-Zelten pipeline, to be built by Arabian Bechtel from the Zelten field to a coastal storage and loading terminal at Marsa el Brega, 100 miles north. Construction of this 30-in. line began in January 1961. Total cost of the project, which includes a stabilized road along the right-of-way, will be about $16 million. Cost of the pipe was $5.1 million, delivered at Marsa el Brega.

Esso was on its 17th Zelten well by the end of 1960. All are inside locations now, and all are producing wells. Esso made a good discovery in its E1-20 well, on the joint acreage with Libyan American. The discovery had not as yet been evaluated, but it flowed 500 b/d on a ½-in. choke. Over 200 ft of saturated oil was found. During January 1961, the company was drilling two stepouts—one three kilometers northeast, the other four kilometers northwest. This discovery came as a surprise, since Esso had previously drilled four dry holes in the vicinity.

Ohio Oil Co., Amerada Petroleum Corp., and Continental Oil Co. formed Oasis Oil Co. of Libya Inc. to conduct future exploration, development, and transportation operations for the three parent companies. It will not engage in refining or marketing operations. The president is T. A. van Griethysen; executive vice president is R. E. McMillen. Ralph Williams, former assistant manager of the California division of Amerada, is vice president in charge of the new Oasis' New York office.

Oasis completed an oil well in the Dahra field of Libya which flow-tested at the rate of 11,500 b/d in 1960. Located in concession 32, the F-9 well, flowing 40-deg gravity crude, extended the Dahra field 2¼ miles southeast from the group's F-2 well which had tested at the rate of 8,000 b/d. Crude from the new well flowed through perforations from 3,066 ft to 3,106 ft and 3,120 ft to 3,130 ft. The well's total depth is 3,374 ft. The F-9 well was the group's 11th oil or gas producer in the Dahra field (see table).

A $40-million Libyan pipeline and export terminal is planned by the Oasis group, with participation by Esso. The 300,000 b/d pipeline will connect Oasis' Dahra field to the Mediterranean coast. The gravity-flow line will be 30 in. in diameter and 86 miles long. The installation of pumps on the line could substantially increase capacity if an increase is needed later.

A 36-mile 20-in. line will run from Esso's field northeast of Dahra to a junction point. Es Sider has been chosen as the export terminal site, slightly northeast of Dahra field and some 390 miles east of Tripoli.

Atlantic Refining received a concession over offshore areas, granted on June 18, 1960. Duration is 50 years. The company is not subject to any higher royalty, but has waived the percentage depletion in favor of cost depletion.

CORI Grant: Direct word by Anis Qasem, former member and adviser to the Petroleum Commission, stated the 1960 concession granted to CORI, affiliate of AGIP Mineraria, "provided for payment of a 17% royalty, surrender of the percentage depletion allowance and, after the discovery of oil in commercial quantities, an option to the government to participate to the extent of 30% in the search for, exploitation, development, transportation within Libya, and marketing of the oil. Should CORI decide to commence other petroleum operations, such as refining, the government shall have the right to participate in such operations to no less than 30%. The government will be represented on both the board of directors and the board of controllers. Expenditures incurred prior to the participation of the government will be recovered in the normal way, and the government's rights under the petroleum law are not affected."

Reserves: Estimates for proved recoverable reserves in Libya are usually classified as premature at this time, but some educated guesses can be made. Generally, reserves are considered by oil circles to be much lower than press reports indicate.

Reserves at the end of 1960 are estimated at a median point of two billion barrels for all of Libya. This includes Oasis's oil find which is estimated to be some 100 square miles of productive area at about 20,000 bbl per acre-foot, which amounts to some 200 to 500 million barrels, perhaps as high as 640 million barrels. In Dahra field, there may be an additional 400 million barrels. Libyan American should have 200 million barrels of reserve, not including the discovery made in December 1960 by Esso Sirte on their joint acreage, which has not been evaluated as yet. The Zelten field has 800 million to 1.2 billion barrels estimated reserve. There appear to be some 25,000 square miles in the Libyan trend productive of 100,000 bbl per square mile. That would be in the 2.5 billion-barrel class.

Reserves may rise to five to eight billion barrels in five years. Using the rule of thumb that it takes 500 million barrels of reserve to produce 100,000 b/d, production in Libya would then be 1,000,000 b/d to 1,600,000 b/d at the end of five years.

REFINING: There is no refinery at present, but Esso Sirte has agreed to build a 4,000 b/d refinery for local demand (currently about 2,200 b/d) in return for the Libyan government's approval of its 1960 pact to buy a 50% interest in three tracts held by Libyan American Oil Co. The plant will probably be located at the coastal terminus of the major pipeline planned by Esso Libya for its Zelten discoveries.

Nelson Bunker Hunt has made a deal with British Petroleum to take over 50% of his con-

NOW—FOUR GEOPHYSICAL SERVICES AVAILABLE FROM ONE SOURCE

The Robert H. Ray Companies are the first to offer four proven, subsurface, data-gathering methods. These services are available now — anywhere in the world.

To provide you the finest in Gravity, Magnetic and Seismic services, including Geograph, the Robert H. Ray Companies employ teams of highly trained technicians, experienced field crews, and the finest precision instruments and equipment.

More than twenty years of continuous operations in domestic and foreign areas give you the benefit of worldwide experience. Intensive research and development, eighteen years on Geograph alone, is your assurance of continual progress, new and progressive concepts in geophysical techniques. These advantages are put to work for you with each Robert H. Ray Companies contract.

Let us explain how the four services of the Robert H. Ray Companies can fit into your geophysical program.

For Geograph in Europe and the French Zone contact GEOGRAFRANCE, 48 Blvd. de Latour-Maubourg, Paris 7e.

ROBERT H. RAY GEOPHYSICAL COMPANIES

2500 Bolsover, Houston 5, Texas

LIBYA—Surrender Data, End 1960

Concession No.	Concession Holder	Original (Square Kilometers)	Surrendered (Square Kilometers)	Retained (Square Kilometers)	Receival Date
2	N. B. Hunt	11,753	A— 2,990	8,763	17 Nov. 60
1	Esso	20,788	A— 678		
			B— 2,888		
			C— 1,683		
			5,249	15,539	19 Nov. 60
18	Liamco	7,163	A— 941		
			B— 579		
			C— 288		
			1,808	5,355	8 Dec. 60
19	Liamco	7,437	A— 1,887	5,550	8 Dec. 60
25	Amerada	8,374	A— 2,145	6,229	10 Dec. 60
26	Amerada		A— 13,443	40,129	10 Dec. 60
30	Continental	16,433	A— 4,139	12,294	10 Dec. 60
31	Continental	26,324	A— 1,711		
			B— 4,878		
			6,589	19,735	10 Dec. 60
32	Oasis	5,131	A— 444		
			B— 894		
			1,338	3,793	10 Dec. 60
33	Oasis	26,094	A— 1,850		
			B— 4,714		
			6,564	19,530	10 Dec. 60
3	Esso	9,877	A— 2,537	7,340	10 Dec. 60
6	Esso	25,690	A— 4,738		
			B— 1,700		
			6,438	19,252	10 Dec. 60
8	Esso	11,852	A— 2,993	8,859	10 Dec. 60
17	Liamco	4,476	A— 1,119	3,357	10 Dec. 60
16	Esso Sirte Liamco	3,709	A— 739	2,970	10 Dec. 60
20	Esso Sirte Liamco	4,708	A— 1,197	3,111	10 Dec. 60
11	Esso Sirte Mobil	19,004	A— 3,251		
			B— 1,568		
			4,819	14,185	28 Dec. 60
12	Mobil	8,004	2,015	5,989	28 Dec. 60
13	Mobil	6,893	1,791	5,102	28 Dec. 60
14	Mobil	7,818	1,975	5,043	28 Dec. 60
42	Amoseas	13,742	A— 3,257		
			B— 217		
			3,474	10,268	29 Dec. 60
43	Amoseas	8,258	A— 517		
			B— 1,549		
			2,066	6,192	29 Dec. 60
44	Amoseas	6,885	A— 1,194		
			B— 597		
			1,791	5,094	29 Dec. 60
46	Amoseas	18,613	A— 871		
			B— 2,201		
			C— 1,626		
			4,698	13,915	29 Dec. 60
47	Amoseas	4,144	A— 904		
			B— 151		
			1,055	3,089	31 Dec. 60
23	CPTL	14,900	A— 1,388		
			B— 2,388		
			3,776	11,124	29 Dec. 60
24	CPTL	6,214	A— 1,205		
			B— 349		
			1,554	4,660	29 Dec. 60

LIBYA—Oil Statistics
(As of January 1, 1961)

Well and Concession	Zone	Production (B/D)	Gravity (API)	Completion Date
A1-32	1	500	39	29 July 1958
A1-32	1	500	36	27 Febr. 1959
B3-32	1	500	36	20 Oct. 1959
B8-32	1	635	33.5	31 July 1960
B11-32	1	460	39°	20 Oct. 1960
B12-32	1	570	37	30 Nov. 1960
B13-32	1	750	40.1	7 Nov. 1960
B15-32	1	1,368	37.3	17 Dec. 1960
F1-32	1	750	41	6 May 1959
F2-32	1	8,000	41	6 Jan. 1960
F3-32	1	1,700	41	16 Dec. 1959
F4-32	1	700	40	16 March 1960
F7-32	1	2,000	42	25 May 1960
F8-32	1	300	40.5	20 May 1960
F9-32	1	11,500	40	27 June 1960
F10-32	1	720	40.2	13 Aug. 1960
F11-32	1	1,540	42.4	17 Sept. 1960
F13-32	1	1,200	40	7 Oct. 1960
F14-32	1	1,180	42.3	15 Oct. 1960
F15-32	1	2,400	40	25 Oct. 1960
F16-32	1	1,050	41	9 Nov. 1960
F17-32	1	1,080	41.5	12 Nov. 1960
F18-32	1	1,200	41.2	2 Dec. 1960
F19-32	1	1,260	40.2	30 Nov. 1960
F20-32	1	1,200	40	23 Dec. 1960
A1-26	4	450	40	6 Febr. 1960
A2-59	2	4,440	35	25 Nov. 1960
B1-59	2	810	33	17 Sept. 1960
B2-59	2	400	35	27 June 1960
B2-1	4	500	46	20 Jan. 1960
C1-6	2	17,500	37	11 June 1959
C2-6	2	15,000	39	31 Aug. 1959
C3-6	2	1,600	39	2 Dec. 1959
C4-6	2	2,500	39	30 Dec. 1959
C5-6	2	2,400	37	1 March 1960
C8-6	2	1,320	39.1	10 Aug. 1960
C9-6	2	1,631	39.5	18 Oct. 1960
C11a-6	2	2,300	39	16 Nov. 1960
C12-6	2	2,060	39.2	2 Dec. 1960
A1-17	1	850	40	5 Aug. 1959
A3-17	1	288	?	23 Aug. 1960
B1-17	1	900	35	4 Nov. 1959
C1-17	1	1,200	37	14 Jan. 1960
A1-66	1	900	38	7 Sept. 1959
E1-66	1	175	39	20 Jan. 1960
F1-66	1	1,200	39	28 April 1960
I1-66	1	650	40	15 Dec. 1960
B1-47	2	3,650	36	30 Sept. 1959
B2-47	2	500	37	30 Dec. 1959
B3-47	2	340	37	17 Febr. 1960
B4-47	2	160	32	1 April 1960
B5-47	2	250	37	13 May 1960
B6a-47	2	1,800	36.4	27 Aug. 1960
A1-70	1	700	44	30 Oct. 1959
A3-70	1	430	42	23 Aug. 1960
B1-41	2	150	32	30 Nov. 1960
B1-12	2	1,000	34	1 Nov. 1959
B2-12	2	675	33.5	4 Aug. 1960
A2-11	1	1,500	42.6	14 April 1960
A3-11	1	890	43.9	27 June 1960
A5-11	1	265	41	24 Aug. 1960
A6-11	1	564	37.1	17 Sept. 1960
B1-49	4	150	45	26 Dec. 1958
63		107,137		

cessions 65. The Petroleum Commission has approved the deal, but it awaits formal approval by the Minister of National Economy. This seems to be just a formality, since Hunt has advertised his heavy equipment for sale and has also sold his rig to one of the French drilling contractors in Libya. Hunt has a well obligation on this concession, and it is rumored British Petroleum took over this obligation for a half-interest. There are other rumors about this concession, stating that British Petroleum is to pay four million barrels of Kuwait crude to Hunt. The arrangement may be extended to other Hunt holdings in Pakistan and Australia as well.

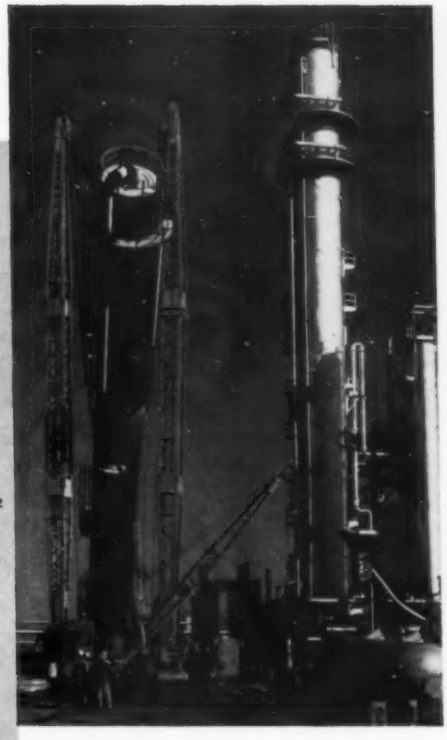
OIL LAWS

For a detailed and highly recommended study of petroleum-industry legislation and regulation within Libya, the editor highly recommends *Petroleum Legislation*. This is a legislative reference service containing a summary and analysis of the oil laws and other industry regulation for Libya, as well as every other major oil country of the world. The national sections are prepared by legal counsel recommended by oil companies who have actually operated within the country concerned. The same oil-law firms keep their reviews up-to-date by loose-leaf revision service. For information on this service, the publisher may be contacted directly at: *Petroleum Legislation Ltd., P. O. Box 1591, Grand Central Station, New York 17, N. Y.*

A decree in 1960 appointed four new members to the Petroleum Commission. They are Saif Nasr, Husain Bal-Aun, Abu Bakr Izmirli, and Mohammed Saifat (chairman). Resignations of Anis Qasem and Tahir Bash were accepted.

Surrender Procedures: *Petroleum Commission Circular Letters 188 and 189*, October 5 and November 5, respectively, outline the procedure for surrendering areas from the present concessions. According to these letters, the surrendered areas will become reserved territories, and in the meantime applications for land in the reservations will not be accepted. Their plan is to wait until after the bulk of the releases is made (by the end of January 1961) before deciding when to open them for applications.

Taxation: A detailed study of taxation of petroleum in Libya has been prepared, and will be available early in 1961 under the "*International Taxation Series*," *P. O. Box 1591, Grand Central Station, New York 17, N. Y.*



ENGINEERING OR CONSTRUCTION PROBLEMS...

find fast, economical solutions when handled by Brown & Root

For more than forty years, Brown & Root has been following the petroleum industry into almost every part of the world where oil is found or processed. In both engineering and construction, Brown & Root can handle every phase of any proposed project within its own comprehensive organization. If you have a project or a problem, get in touch with Brown & Root for a fast, economical completion.

BROWN & ROOT, INC. *Engineers · Constructors*

POST OFFICE BOX 3, HOUSTON 1, TEXAS

NEW YORK, NEW YORK · WASHINGTON, D. C. · LONDON, ENGLAND · EDMONTON, ALBERTA
SÃO PAULO, BRAZIL · MARACAIBO, VENEZUELA · CABLE ADDRESS – BROWNBILT

LET GEOLOGRAPH HELP YOU FIND THE PAY SAND

The Geolograph Recorder is of great assistance in locating Pay Sands, determining Effective Pay Thickness, and showing sections of greater Porosity.

From India to Texas the Geolograph Recorder is furnishing the finest Mechanical Well Logging records available. Wherever oil is found, Geolograph is helping to find it.

Let GEOLOGRAPH Help You.

For Sale Outside the United States and Canada

THE GEOLOGRAPH COMPANY®

MANUFACTURERS ● EXPORTERS

27 N.E. 27TH • P.O. BOX 1291 • OKLAHOMA CITY 1, OKLA.

Koenig INTRODUCES A REVOLUTIONARY NEW TYPE OF HEAVY-DUTY POWER WINCH

FEATURING TORQUE TRANSMISSION DIRECT FROM GEAR SPIDER TO DRUM . . . NO KEYS TO SHEAR

20,000 pounds safe hoisting capacity

Outstanding features of the NEW KOENIG WINCH:

★ Drum torque load is NOT transmitted by drum shaft . . . no keys to shear . . . torque is transmitted direct from gear spider to drum by means of multiple-splined collar in gear housing.

★ Entire unit, including safety brake, is lubricated by the oil-bath principle, with a generous supply of oil to prevent overheating.

★ Engineered to use standard lubricants available throughout the world.

★ Multiple-plate automatic safety brake, running in oil with one-direction clutch, is easily adjusted or released.

★ Accurate drum clutch position indicator.

★ Gear ratio — 38:1.

★ Nickel-bronze alloy worm gear. Hardened and ground worm mounted on Timken roller bearings.

Model 70B with stationary shaft

Pat. Pend.

Model 71B with catheads

THIS ADVANCED-DESIGN KOENIG WINCH IS RECOMMENDED FOR OIL-FIELD EQUIPMENT, PUBLIC UTILITIES, HEAVY WRECKERS, CONSTRUCTION, AND OTHER HEAVY-DUTY JOBS.

Koenig winches have served the industry with dependable pull and hoisting power since 1934. Koenig also builds a complete line of utility and service bodies.

Koenig IRON WORKS, Inc.

P. O. BOX 7726, DEPT. X • HOUSTON 7, TEXAS

OTHER KOENIG PRODUCTS

King Front- and Rear-Mount Winches ★ Service Bodies ★ Side Boxes ★ Maintenance and Personnel Bodies ★ Line Construction Bodies ★ Hydraulic Derricks and Diggers ★ Sleeper Cabs ★ Koenig All-Steel Cabs ★ 3-Way Dump Bodies.

Libyan Petroleum Policy:[1] There are no restrictions contained in law based on nationality, ownership, or size (companies with government participation may obtain concessions, for example) except the one barring companies with connections in Israel. The commission takes into account, however, the capacity of the applicant to place any crude he may find into international markets.

The Petroleum Commission feels that concessions should be granted only to operators who can handle them by themselves, without requiring that the concession holder should be a single company.

It is established policy of the Petroleum Commission not to grant a concession without a drilling commitment. Failure to meet such commitment may lead to the forced surrender of the whole concession area.

As an alternative—and sometimes in addition to the drilling commitment—agreement may be reached regarding the amount to be spent for a period of years on exploration.

One feature of financial policy development has been to agree with some applicants to make to the government an additional payment out of oil by way of deferred bonus for the grant of a concession.

A main subject for consideration is the depletion allowance. The first stage started with an agreement with California Asiatic (combined with Texaco Overseas) on November 10, 1957, in which it was agreed that the amount claimed as depletion should, within a specified period of years, be spent on exploration in the concession area. The second stage of development was to do away with the percentage depletion allowance entirely and to keep intact the cost depletion allowance as provided by law. In this respect, the petroleum law gave the concession holder the right to elect either the percentage or the cost depletion allowance. The commission has argued with applicants to choose for the duration of any concession which may be granted the cost depletion allowance and renounce the claim to the percentage depletion allowance.

The first concession with these terms was granted to British Petroleum Co. on September 5, 1959. It is now the established policy of the Petroleum Commission not to grant concessions unless percentage as distinguished from the cost depletion allowance is elected. Another major oil company (Esso Sirte) agreed to this in a case of assignment of acreage held by a Texas Gulf Producing Co. subsidiary.

The commission has granted a concession to Pan American International Oil Co. with the surrender of the depletion allowance and a drilling commitment as the only conditions. However, Pan American had already agreed, at the time of the grant, to the effective surrender of the depletion allowance in its oil concessions and to the payment of a bonus out of oil.

An agreement has been reached with one of the major oil companies (Esso Sirte Inc.) to establish a refinery to meet local demand, with basic facilities for expansion. END

[1] *Source:* This review is taken from *Petroleum Legislation,* Libya section. It is based on material prepared by Anis Qasem, former chairman and member of the Petroleum Commission. For the complete Libya section, address requests to *P. O. Box•1591, Grand Central Station, New York 17, N. Y.*

ALGERIA (OCRS)

The development of pipeline transport to the coast has made a great deal of difference to Algeria's oil industry. Activity during 1960 did not slow down; on the contrary, a refinery was approved and marketing plans have been laid for export of Saharan crudes outside the Franc Zone.

EXPLORATION: *Algeria (Excluding OCRS) During 1960:*[1] Activity during the year 1960 was concentrated on the Djebel Onk, in the Constantine southeast and on some surface work in the central part of the Saharan Atlas (Djebel el Azreg).

Grant of five exploration permits brought a revival of activity in the area during the last quarter of 1960.

OCRS (Excluding Algeria) Activities During 1960: Exploration in the French Sahara has brought knowledge of the underlying regional geology, masked on the sûface by an extensive covering of horizontal recent formations. A number of structural basins and highs have been identified. They are: Northeast Province (Triassic basin); Haut-Fond Rharbi-Namous uplift—Colomb Bechar basin; Tindouf and Reggan basins (Eglab Massif border); MacMahon-Ahnet basin; El Biod uplift and Hassi M'Segguem slope; and the Polignac basin.

During 1960 exploration activity in the northeast province was influenced by 1959 discoveries at Bordj Nili (Upper Carboniferous); El Gassi (Cambrian), Hassi Tourag (Trias and Cambro-Ordovician) and Hassi Messaoud (Ordovician).

Outside of local work to evaluate the importance of these discoveries, seismic and drilling exploration took place in a number of areas which comprised the extension of known features, especially on the northeast extension of the Tilrempt arch, the El Gassi-Messaoudhigh and on the eastern edge of this high.

Finally, geophysical reconnaissance of the Triassic basin and especially of the north part of the Erg Oriental was carried out—permitting the spudding-in of certain wells which were drilling at the year's end which will yield important stratigraphic information in areas about which there is still little known geologically.

In the Rharbi-Namous area, only the Devonian has been explored as of the end of 1960, and the results obtained in this objective have never been very encouraging, despite some good shows. AMg. 1 well, drilled by S.P.V., topped the Cambro-Ordovician in a favorable structural position in the Djorf el Atfal permit. No important oil reservoir was found, and there were no shows of oil or gas.

In the Béchar structural basin area, only the southwest section is open to exploration. Seismic work has defined the westward extension of the Rharbi-Namous basement high toward Hassi Ouskir and the old Tk. 1 well.

There was no activity, as had been forecast, in the Reggane basin.

In Tindouf, SAFREP has begun a geophysical reconnaissance program on a wide grid. Certain favorable structural elements have encouraged an intensification of effort within the area covered by SAFREP and its associates.

During 1960, exploration effort within the MacMahon-Ahnet structural basin was reduced to two wells by CPA, drilled to explore the Cambro-Ordovician in a favorable paleogeographic and structural location. One of these wells consisted of deepening Tabalouet-1 on the Idjerane high. The other was drilled on the Oufrance structure of the In Belbel uplift.

Structural reconnaissance north of the El Biod high province was carried out by seismic reflection techniques in 1960 on the CPA and Phillips permits, preparatory to the spudding in of a Phillips well whose objectives were the Lower Devonian and the Cambro-Ordovician.

CPA carried out important drilling on the eastern edge of the El Biod (Azzel-Hamra-Ramade-Anagua) area and obtained favorable results including wet gas at the base of the Masozoic and in the Devonian, at Hamra.

Farther to the south, CEP and CREPS were awarded exploration permits (Tisserass and Tan Elak) covering a series of highly eroded anticlines in the Paleozoic where the Cambro-Ordovician is the principal objective. Interest was aroused in this region by recent Cambro-Ordovician discoveries in the eastern part of Polignac province.

During 1960 exploration activity in the Polignac basin developed at predicted levels.

On the edge of Tinrhert Plateau, CREPS and CEP completed a detailed structural reconnaissance effort of particular importance. The wells led to the discovery of an oil field in the Lower Devonian of Ohanet and to the discovery of very important shows at Oued Zenani, Hassi Mazoula, and Timellaline.

In the Paleozoic structural basin, properly speaking, development work in Zerzaitine was completed and that in Edjélé is being carried on. At the same time, extension of the El Adeb Larache and Tinguentourine-La Reculée oil fields is being continued, as well as that relating to the deep reservoir (Cambro-Ordovician) of Edjélé.

Elsewhere, exploration work has led to the discovery of significant oil accumulations in the Lower Devonian and the Cambrian at Tan Emellel, and of gas at Ténéré El Beugra and Taouratine.

The discoveries on Tinrhert plateau and the favorable results obtained in the Cambro-Ordovician, in the eastern zone, are arousing interest among companies in the western half of the basin, covered by the Erg (sand sea) Issaouane and little explored until now. All the areas of interest are covered by exploration permits now; 30% of the total activity in Polignac basin will be devoted to this western zone (end of Perrodon Review).

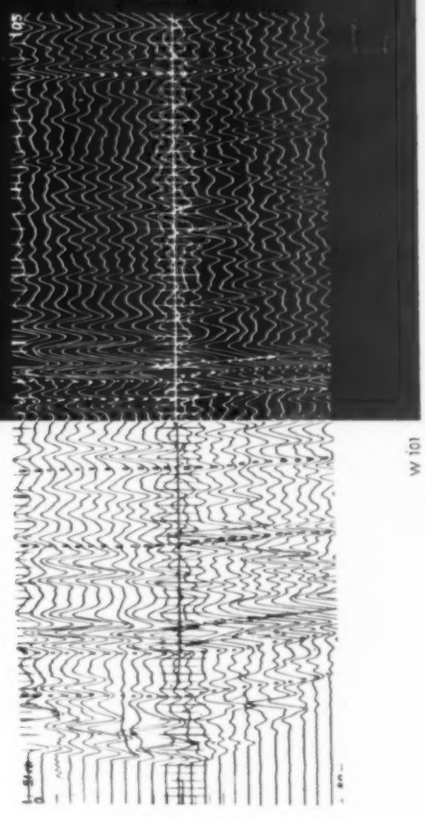
Standard Oil Co. (New Jersey) has not yet begun drilling on its permit in the eastern Sahara. At the end of 1960, the company had two seismic crews working. A rig is to be installed during late 1961.

Mobil International Oil Co., through one of its French affiliates, has signed an agreement with a French company, Cie. d'Exploration Pétrolière (CEP) and associated companies, for a 25% interest in petroleum rights to ap-

[1] Review by A. Perrodon, BRP.

GEOSIT

having HIGH RATE OF DETONATION
HIGH ENERGY LEVEL
being HIGHLY CLIMATE-PROOF



W 101

WASAG supplies further different types of
SEISMIC EXPLOSIVES
powdery and gelatinous
suitable for all kinds of REFLECTION
and REFRACTION WORK
available in any desired cartridge type with
or without fast coupler

plus WASAG's blasting agent **WASAMON**

Long experience and continuous development
guarantee the quality of our products

Agencies in all Parts of the World.

For further information please contact

WASAG-CHEMIE AG

ROLANDSTRASSE 9 ESSEN/GERMANY

proximately eight million acres along the Libyan border of the Sahara between the Edjélé and Hassi Messaoud oil-producing areas. CEP had conducted an exploration program in the area for the past several years, and will continue as operator. CEP is owned 51% by the Bureau de Réchèrche de Pétrole and 49% by various public and private investment interests in France. Under the terms of the agreement, CEP will retain a 38% interest in the petroleum rights; its four associated companies, Francarep, Coparex, Eurafrep, and Amif, will have 37%; and Mobil will acquire 25%, part of which will be held by Mobil's French affiliates. Crude oil to be produced is considered French Community crude.

CEP announced in April 1960 a wildcat discovery known as Ohanet 1, approximately 350 miles from the Mediterranean near the Libyan border of the French Sahara. It is approximately 30 miles from a crude-oil pipeline linking the Edjélé, Zarzaitine, and Tiguentourine oil fields with the Mediterranean. On drill-stem test, the well flowed at the rate of 1,900 b/d of light-gravity oil through a 1-in. choke. The tested producing zone is at a depth of approximately 7,740 ft. Tests in formations immediately above the oil zone showed substantial quantities of natural gas.

The discovery is important to Mobil because it gives the company a source of French Community crude. Companies refining oil in France have been asked by the authorities to take most of their crude oil from the French Community.

PRODUCTION: Original forecasts by French sources of production of a million barrels per day in the Sahara by 1965 have been revised downward to 620,000 b/d, the full capacity of the two pipelines which will be in operation from Hassi Messaoud and the CREPS fields near the Libyan border. They will have 280,000 b/d and 340,000 b/d capacity, respectively. The original French estimates were based on expectations of further important discoveries which did not materialize, especially when Hassi el Gassi discovery was followed by four disappointing stepouts (before the CEP discovery, however). The French now estimate 170,000 b/d in 1960; 340,000 to 380,000 b/d in 1961, of which Hassi Messaoud will supply from 170,000 to 200,000 b/d and CREPS' fields from 170,000 to 180,000 b/d.

In 1962, production should reach 380,000 to 500,000 b/d compared to 510,000 to 620,000 b/d fixed in 1960. Of the new estimated amounts, 200,000 to 280,000 b/d may come from Hassi Messaoud and 170,000 to 220,000 b/d from the eastern areas.

A third Algerian Sahara oil area—El Gassi-El Agreb—will go into production in 1961. The operator is the French government-controlled Ste. Nationale des Pétroles d'Aquitaine (SNPA), which has as its partners Coparex, Eurafrep, and Francarep, all French firms. The company has already completed five producers in the area 75 miles southwest of the big Hassi Messaoud field. The new oil area is expected to produce some 10,000 b/d at the start. According to SNPA, production from the four El Agreb wells, No. 2, 6, 7, and 8, will be about 8,000 b/d. The remaining 2,000 b/d will come from the No. 1 El Gassi, discovery well for the area. The French firm intends to complete a 10-in. pipeline by next May. The line will run 75 miles to the Hassi Messaoud field.

Gas Prices: Large industrial users have been offered gas for 3.15 centimes per cubic meter of 8.25 therms, or about U. S. 0.0064¢, in Algiers in the spring of 1961 when a gas line is to be completed from Hassi R'Mel to Oran, Arsew, and Algiers. This is one of the lowest prices for gas in the world. Large industrial users are those using at least 10 million cubic meters a year. Middle users, taking three to 10 million cubic meters a year, will pay the equivalent of 0.01¢ per cubic meter.

Reserves: Total proved recoverable reserves for the French Sahara (OCRS) are estimated at 2.9 billion barrels. This includes 1.9 billion barrels for the Hassi Messaoud field and one billion for the Zarzaitine, Edjélé, and other fields belonging to CREPS. Source of these reserve figures for CREPS is R. H. Levy of CREPS in a letter to the editor dated October 14, 1960. He gives reserves as follows: Zarzaitine—87 million metric tons; Edjélé—33 million metric tons; other fields—24 million metric tons; total—144 million metric tons. This is equivalent to about one billion barrels.

Reserve estimates for Hassi Messaoud are based on an article written by Messrs. C. de Lapparent, head of the geological department, and P. Albert, head of the Reservoir Bureau of Cie. Française des Pétroles (Algérie), published in *World Petroleum* for June 1960. In that article (p. 46) the possible existence of 2.5 billion tons of oil ("reservoir conditions") is stated. This is equivalent to approximately 19 billion barrels of oil in place. Since recoverability is estimated at about 10% in Hassi Messaoud field, total reserves are about one-tenth of this figure, equivalent to roughly 1.9 billion barrels.

Estimates of natural-gas reserves in industry circles are confined to Hassi R'Mel. They calculate 26 trillion cubic feet of gas reserves, plus 630 million barrels of distillate.

TRANSPORTATION: The Hassi Messaoud-Buogie pipeline was completed in late 1959, and was in operation during all of 1960. A second major line was put in operation October 1, 1960, when the first Edjélé crude was loaded at La Skhirra port in Tunisia.

The 460-mile 24-in. system moves crude from Edjélé, Tiguentourine, and Zarzaitine oil fields. Initial capacity is 144,000 b/d. This will be increased to 190,000 b/d early in 1961 when expansion of pumping facilities is completed. TRAPSA, the transportation subsidiary of CREPS, built and will operate the pipeline.

Ste. Nationale des Pétroles d'Aquitaine announced plans for a 75-mile 10-in. line from the El Agreb and Hassi El Gassi fields to Hassi Messaoud. The crude then will feed into the existing 24-in. line to the port of Bougie for export by tanker. Construction is to be completed by June 1961. The line has received approval of the French government. SNPA anticipates a production rate of 500,000 tons a year (10,000 b/d) by 1961 after completion of 20 wells by the middle of the year.

A 340-mile 30-in. line from the new Ohanet field of CEP to Hassi Messaoud received approval by the French government. The line will feed into the existing 24-in. line to the port of Bougie. The field is expected to have annual production of 1,500,000 tons (30,000 b/d) by late 1961, with the drilling of another 20 to 25 wells.

ALGERIA—Exploration, 1960

Area	Geophysical (Party-Months) Gravimetric	Reflection	Drilling (Rig-Months)
Chellala-Reibel		2.	
Recheiga	2.5*		
Telagh	2.5	2.5	
Bir Rabalou-Aumale			
Chélif			1
Tebessa			7.5†
Djebel Azreg‡			
Total	5	4.5	8.5

*Double team. †Including tests at DK.1. ‡Permit not granted at year's end. Summary does **not** include OCRS.

REFINING: There was no refinery in Algeria at the end of 1960, but 1962 has been set for operation of a 44,000 b/d refinery to be built by a seven-company group, in the city of Algiers. The refinery, planned to serve Algerian needs, will process Sahara crude, but it could also process sour crudes. Participants are: Esso, 16.2%; Shell, 21%; Mobil, 6%; British Petroleum Co., 12%; Cie. Française des Pétroles, 23.8%; Cie. Française de Raffinage, 14%; and Beryl Algeria, 7%.

A small refinery to provide tax-free oil for local consumption will be built near the Hassi Messaud field by SN Repal, half-owner of the field, and Cie. de Raffinage en Afrique du Nord. When the plant goes onstream in June 1961, it will produce gasoline, gas oil, kerosine, and butane to be sold at prices described as among the lowest in the world.

A stabilization plant on the CFP(A) side of Hassi Messaoud oil field is being expanded to 100,000 b/d from 54,000 b/d.

OIL LAWS

For a detailed and highly recommended study of petroleum-industry legislation and regulation within Algeria and the OCRS, the editor highly recommends *Petroleum Legislation*. This is a legislative reference service containing a summary and analysis of the oil laws and other industry regulation for Algeria and the OCRS, as well as every major country of the world. The study is prepared by legal counsel recommended by oil companies who have actually operated within the country. The same legal counsel keeps the review up-to-date by loose-leaf revision service. For information on this excellent service, the publisher may be contacted directly at:

FRENCH SAHARA (OCRS)—Exploration, 1960

	Geophysical (Party-Months) Gravimetric	Refraction	Reflection	Drilling (Rig-Months) Shallow	Medium	Heavy
Triassic Basin	1.5	58.5	89.2	—	—	84
Zones	—	7	2	—	—	—
Haut Fond d'El Biod	4	—	15.5	—	1	21
Tindouf-Reggane	—	—	16	—	—	—
Polignac	4.5	—	52.7	3	51	34
MacMahon-Ahnet	—	—	—	—	2.5	2
Béchar-Rharbi	—	11.5	5	2	8.5	4.5
Total	10	77	180.4	5	63	145.5

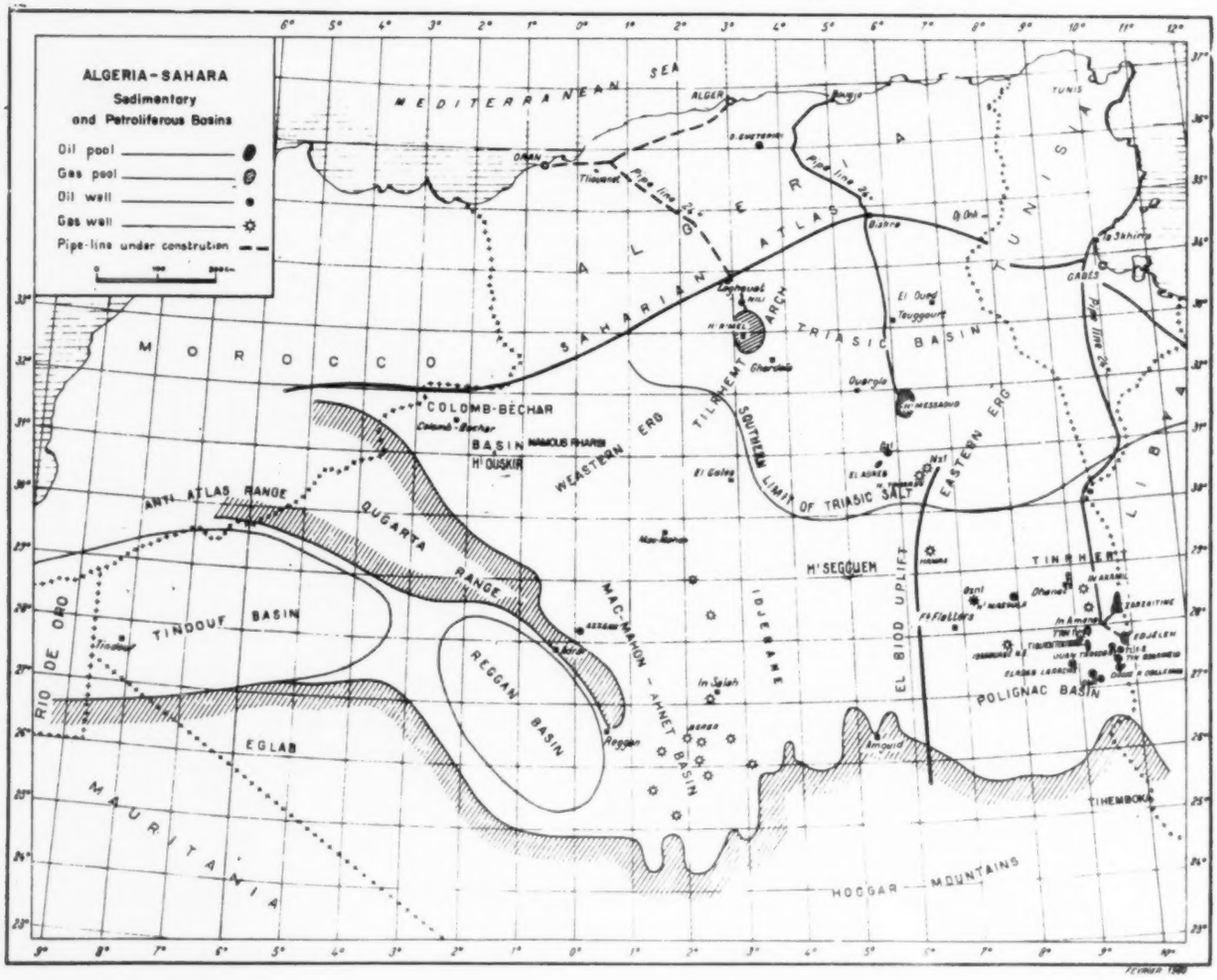
100 lbs.
Magcobar
HEAVY MUD WEIGHT
FOR OIL WELL DRILLING
MADE IN IRAN
SHERKAT SAHAMI
MAGCOBAR IRAN
TEHRAN IRAN
NOW
MAGCOBAR
IN
IRAN
Magcobar Baryte is now being produced at PARANDAK, IRAN. Look ahead to Magcobar for continued technological leadership in drilling muds and chemicals in Iran from this new, convenient location.
SHERKAT SAHAMI MAGCOBAR IRAN
264 EISENHOWER AVENUE
TEHRAN, IRAN

25 KILOS NET
MAGCOBAR
BARYTES
HEAVY MUD WEIGHT
FOR
OIL WELL DRILLING
MYKOBAR MINING CO. S.A.
MYCONOS, GREECE
MAGCOBAR
MAGCOBAR
NOW
MAGCOBAR
FROM
GREECE
Magcobar Baryte is now being produced at MYCONOS, GREECE. Look ahead to Magcobar for continued technological leadership in drilling muds and chemicals in Europe, North Africa and The Middle East from this new, convenient location.
MYKOBAR MINING COMPANY S. A.
MYCONOS, GREECE
Sales Representative: DRESSER A. G.
MUEHLEBACHSTRASSE 43
ZURICH, SWITZERLAND

ALGERIA (OCRS)—Principal Wildcats in 1960

(Review By A. Perrodon, BRP)

Basin	Well Name	BRP Coordinates Degrés Geographiques X Y	Final Depth (Meters)	Bottomed in	Objective	Company	Remarks
Province Nord-Est	Bou Aïcha 1	4°32'34"E 32°58'28"N Z = 429.58	3,565	Socle	Trias and Cambro-Ord.	PREPA	Dry
	Hassi Saïf 1	5°12'31"E 33°46'N Z = 259	4,318	Cambrian	Paleozoic	CFP(A)	Dry
	Nezla 1	6°30'30"E 30°42'30"N Z = 190	3,394	Cambrian	Paleozoic	COPEFA	Wet Gas Producer
Rharbi Namous	El Arich el Megta 1	0°11'30"08W (X) 31°10'09"82N (Y) Z = 658.6	2,451.4	Cambrian	Paleozoic	SPV	Dry
Béchar	Hassi El Mir 1	1°42'37"W 31°33'23"N Z = 711.9	2,003	Upper Visean	Carboniferous	SN REPAL	Dry
MacMahon-Ahnet	Oufrane 2	0°08'17"E 28°27'03"N Z = 298	1,516.2	Cambrian	Cambrian	CPA	Dry
	Tabaloulet 1	3°00'57"E 28°40'39"N Z = 543.95	2,745	Cambrian	Cambrian	CPA	Dry
Ht. Fond d'El Biod	Azzel 1	6°19'49"E 29°44'30"N Z = 252.23	3,631.2	Cambrian	Cambrian	CPA	Dry
Talus Hassi M'Segguem	Ramade Nord 1	6°14'32"E 29°17'41"7N Z = 286.04	2,239	Cambrian	Cambrian	CPA	Dry
	Anagua 1	6°30'56"5E 28°19'03"2N Z = 385.72	3,002.9	Cambrian	Cambrian	CPA	Dry
Polignac	Oued Zenani 1	7°15'27"E 28°29'59"N Z = 443	2,349.1	Socle	Paleozoic	CREPS	Oil producer in the Lower Devonian and gas producer
	Ohanet 101	8°56'37"E 28°40'27"N Z = 580.2	2,536.4	Gothlandian	Paleozoic	CEP	Oil producer in Lower Devonian
	Ohanet 102	8°55'36"E 28°43'45"N Z = 544.89	2,939	Socle	Paleozoic	CEP	Oil producer in Lower Devonian and gas producer
	Tan Emellel 1	9°44'33"E 27°30'5"N Z = 519.27	1,537	Socle	Paleozoic	EURAFREP	Oil producer in Cambrian
	Tan Emellel 2	9°43'34"E 27°30'34"N Z = 519	1,535	Cambro-Ordovician	Paleozoic	EURAFREP	Oil producer in Lower Devonian
	Taouratine 1	9°02'35"E 27°51'30"N Z = 491	2,551	Socle	Paleozoic	AMIF	Gas producer. Oil shows in Lower Devonian
	Ténéré el Beugra 1	9°29'25"E 27°42'25"N Z = 464 U.T.M.	2,092.7	Socle	Paleozoic	CREPS	Gas Producer
	Krebb 1	502.950 3.155.275 Z = 669	2,622.5	Gothlandian	Paleozoic	CREPS	Oil shows in Lower Devonian



ARE YOU SELLING to the OIL INDUSTRY?

Here is the New 1961 Edition international oil industry's oldest and most complete directory:

INTERNATIONAL PETROLEUM REGISTER

It has been completely redesigned to place at your fingertips the most up-to-date information on every oil producing company, wherever in the world it operates.

Every one of your district sales offices and your distributors should have a working copy of the 36th Edition of the International Petroleum Register. The price is only $25.00 for this over 500-page book of over 30,000 names.

Send in your orders today, take a look, and we know you'll be more than satisfied.

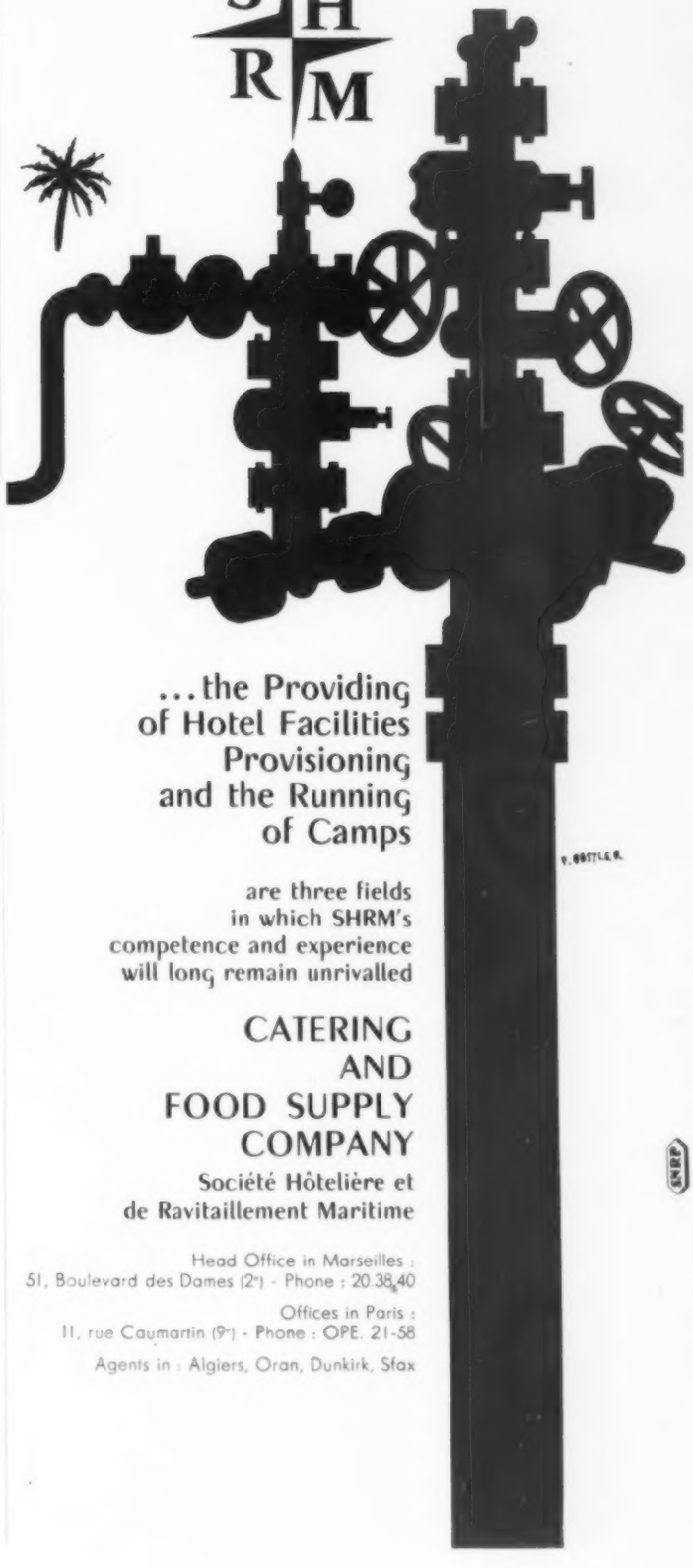
INTERNATIONAL PETROLEUM REGISTER

25 West 45th Street

New York City 36, U.S.A.

IN THE SAHARA
as elsewhere...

S H
R M



...the Providing of Hotel Facilities Provisioning and the Running of Camps

are three fields in which SHRM's competence and experience will long remain unrivalled

CATERING AND FOOD SUPPLY COMPANY

Société Hôtelière et de Ravitaillement Maritime

Head Office in Marseilles :
51, Boulevard des Dames (2e) - Phone : 20.38.40

Offices in Paris :
11, rue Caumartin (9e) - Phone : OPE. 21-58

Agents in : Algiers, Oran, Dunkirk, Sfax

Petroleum Legislation Ltd., P. O. Box 1591, Grand Central Station, New York 17, N. Y.

The "Model Convention," designed to accompany new concession grants in the OCRS, was passed early in January 1961.

Law Translations: Entire text of the OCRS oil legislation has been translated and published in a noteworthy collection, *"North Africa—Basic Oil Laws and Concession Contracts."* It is a word-for-word compilation of applicable laws, which includes oil regulation for the other countries of North Africa as well. Translations are accurate, and the service is highly recommended. For information, address inquiries directly to the publisher, *Petroleum Legislation Ltd., P. O. Box 1591, Grand Central Station, New York 17, N. Y.*

NATIONAL FACTORS

The recent election results favoring an independent Algeria may have a significant effect on concession holdings there. The French have divided the OCRS area from northern Algeria, and most of the concessions found to date have been discovered in the OCRS. However, this division may not be observed should the former rebel government come to power. The only indication is statements by rebel leaders, and these are conflicting. An October 1957 declaration by the FLN stated: "Algeria will never be involved as a result of treaties, accords, conventions, or other agreements which France has or will make in her (Algeria's) name." A later statement, reported on October 22, 1959, in the *New York Times*, stated that Ferhat Abbas, premier of the provincial government, had said that "Investments of French and other countries will be respected *in independent Algeria* on condition that these investments do not interfere with the [North African] rights of ownership."

Taxation: A detailed study of taxation of petroleum in Algeria and the OCRS has been prepared, and will be available early in 1961 under the title *"International Taxation Series."* This series is devoted exclusively to petroleum taxation, covering every type of tax imposed on petroleum operations in all countries. Marketing, refining, transportation, exploration, and production taxes are covered, with a separate study of each. For an example of one of these national studies (all prepared in exactly the same format), please refer to the accompanying section herein entitled *French Sahara-Petroleum Industry Taxation.* Requests for information on the entire series should be addressed to *"International Taxation Series," P. O. Box 2744, Grand Central Station, New York 17, N. Y.*

FRENCH SAHARA (OCRS) PETROLEUM INDUSTRY TAXATION[1]

The taxation on oil exploration, production, and transportation in the OCRS territories is provided by several basic documents, viz., Ordinances 58-1111, 58-1112, 58-1113—all of which were promulgated on November 22, 1958; Ordinance 58-1200 of December 11, 1958; and a handful of government decrees and regulations implementing the statutory new régime. These documents set forth the principles applicable to the taxpayer—the rules of procedure on assessment, computation, amortization etc., being those of the current Internal Revenue Codes of France and/or Algeria. Crude-oil and gas operations in the Sahara (excluding, therefore, other activities such as refining, marketing etc., which continue to be liable to general business tax provisions) are thus covered by a specific pattern of taxation, the subject of this review. It may be worthwhile to mention also that this specific taxation applies to operations actually carried out within OCRS even though, for practical reasons, the interested parties may have set up their management, technical staff, and other facilities outside OCRS in Algeria or in metropolitan France, and notwithstanding the fact that Algeria and OCRS have otherwise a different administrative status.

[1]Review by Bernard A. Dubais, Cie. Francaise des Petroles, Paris. Source: International Taxation Series, Post Office Box 2744, Grand Central Station, New York 17, New York.

Exploration and Production

PRINCIPLE: Exploration and production profits are liable to the same tax régime, consisting of (1) royalty and (2) income tax, as described hereunder (Ord. 1111, Art. 62). There are no surface taxes, no rentals at either stage, and practically all common-law indirect or excise taxes and duties are either deductible or nonapplicable. Under this 50-50 scheme, therefore, all exploration and production results may be consolidated for tax purposes; but a company engaged in these operations and, at the same time, in transportation and other activities would have to segregate in its accounting those results which resort to exploration-production, those to transportation, and those to other activities (*ibidem*, Art. 64). The same principle applies not only to the title holder but also, if such is the case, individually to each of its associates which have a direct right on their share of the oil and gas in place, whatever the legal nature of their arrangement.

ROYALTY: On all net production of oil and gas, i.e., the production flowing out of the unit of production (*centre principal de collecte*), after deduction of oil and gas consumed on the premises, reinjected or lost (Ord. 1111, Art. 63 and arrêté March 30, 1960, Art. 2). (a) Rates of 12.5% (oil) and 5% (gas) of the field value. (b) "Field Value" defined (arrêté 3.30.1960, Art. 3) as the "basic f.o.b. terminal price" minus transportation costs (actual rate of transportation, storage, loading, handling, and other direct expenses). The so-called "basic f.o.b. terminal price" is arrived at by government authorities as the average contract price, on f.o.b. basis, calculated for each quarter and readjusted, if necessary, to make it comparable with the going market price. Transportation rates are submitted to and controlled by government authorities (Ord. 1111, Art. 50). (c) For oil, royalty may be discharged in cash or in kind, at government option; for gas, it is always paid in cash (Ord. 1111, Art. 63). (d) The "field value" being assessed quarterly, payment of royalty is made by monthly installments (arrêté 3.30.1960, Art. 8 et sq.); in case of default, nondeductible penalty of 1/1000 per diem.

INCOME TAX: A single tax, at the rate of 50%, is levied on the difference between the amount already paid for royalty during the assessment year and the taxable income for that year (Ord. 1111, Art. 64 and 65). In any fiscal year, a taxpayer will thus bear taxation at minimum to the extent of royalty paid on net production, and at maximum to the extent of 50% of taxable income. Whenever taxable income is smaller than royalty payments already made, a tax credit is allowed against future income-tax liability (Ord. 1111, Art. 65). (a) Net taxable income is defined as the difference between the net book values of assets at close of fiscal year and those at opening of the same year. In accordance with French taxation technique, this definition includes not only the net operating results, but also the net variation in value, if any, of capital assets—this calculation to be made following certain rules which have not been published yet (*ibid.* Art. 64), (b) Art. 64, §§ VI and VII of Ord. 1111, lists the various items which must appear in the credit part of the profit-and-loss sheet, and those which may be charged to debit. Without analyzing in detail the latter point, suffice it to say that interests and agios cannot exceed 8% of the sums borrowed; depreciation rates may be negotiated "within the limits currently in use in the petroleum industry" (nonproductive exploration and drilling expenses may be written off at 100%), and provision is made for a percentage depletion allowance. (c) The depletion allowance amounts to 27.50% of the "field value," as defined above, of the production, provided it does not exceed 50% of net income. The deductible sums are entered under a special heading in the profit-and-loss sheet for each fiscal year. These moneys become taxable either when distributed or at the expiration of a five years' delay. Thus, the depletion allowance may be regarded as simply a financial advantage to the taxpayer (*ibid.*, Art. 66).

TAX EXEMPTION: As said above in Par. 1 (PRINCIPLE), the 50-50 régime precludes in itself any tax liability other than the royalty and income tax, which are paid in lieu of normal business taxation. Several legal provisions have confirmed the principle by way of specific exemptions. (a) *Direct taxation on profits* (State or local), exemption of all taxes levied on exploitation profits (Ord. 1111, Art. 67, Par. 1). (b) *Dividend-tax* exemption in France (*ibid.* Art. 67); in Algeria (Ord. 1200, Art. 1 and 2); and in Overseas Territories (Ord. 1113, Art. 1 and 2). These measures benefit not only the producing companies' shareholders, but also their own shareholders in the case of groups of affiliated companies. (c) *Tax on "professional activity"* which exists only in Algeria (Ord. 1111, Art. 67 and Ord. 1200, Art. 3). (d) *Production and service taxes* exemption in France and Algeria (Ord. 1111, Art. 67, § III and Ord. 1200, Art. 3) provided the goods, equipment, and services are exclusively used for exploration and production in OCRS. Lists of goods, equipment, and services, as well as lists of the contracting firms eligible for exemption, have been published, together with the applicable rules of procedure, by Decree 59.1160 and Decree 59.1162—both of September 16, 1959—for France and Algeria (also two administrative decisions of same date). The same exemption applies to goods, equipment, and services imported from foreign countries and from independent territories still members of the French Community. (e) *Import-duties* exemption in all cases when equipment and industrial products originate from France and French Community independent territories. When imported from other foreign countries, exemption only if it proves impossible to acquire similar goods, under the same conditions, within France and French Community independent territories. Said exemption becomes void if imported goods and equipment cease to be used for oil exploration or production (Ord. 1111, Art. 68).

OTHER TAX LIMITATIONS: Exploration and production companies remain liable to certain general taxes and duties such as stamp taxes, property transfer taxes, registration taxes, taxes on salaries, on vehicles etc.; but they are protected against any increase of such taxes to the extent of 50% of the actual rates existing on November 22, 1958 (Ord. 1111, Art. 67, § II and Ord. 1200, Art. 3). Furthermore, since the taxpayers are allowed (Ord. 1111, Art. 64, § VII) to debit their profit-and-loss sheets of such charges for the purpose of computing their taxable income, they actually bear only half of these taxes. Overall, it has been estimated that the incidence of these common-law taxes (some of which can be avoided altogether depending upon the type of legal arrangements chosen by associated taxpayers) should not jeopardize the 50-50 principle in any serious manner over a long period of time.

Transportation

PRINCIPLE: Taxation applicable to oil and gas transportation is defined by Ord. 1111, Art. 69 and Ord. 1112, Art. 5. It consists of a single tax at the rate of 50% on net income computed in the same manner as for production [Par. (a) and (b) under Income Taxes above]. (a) No royalty and no depletion allowance. (b) Some tax exemptions and tax limitations except for the "professional activity" tax applicable in Algeria, a municipal tax at a rate varying from 1% to 3% of total company sales (Internal Revenue Code of Algeria, Art. 242 et sq.).

Guarantees of Investments in Production and Transportation

LONG-TERM CONTRACT: Investors' rights and obligations for oil and gas production and transportation are to be embodied in a contractual instrument of concession between the State and the title holder, the concession being an exclusive and nondiscriminatory right for a period of 50 years (Ord. 1111, Art. 25, 26, 27, and 28). A standard convention as provided by Art. 26 and 27 of said ordinance is to be punished by decree, and will apply to all investors.

STABALIZATION OF TAXATION RÉGIME: The 50-50 taxation as described above is stabilized both for production and transportation activities for a period of 25 years after the grant of a concession plus five years for exploration or for completion of pipelines, a total of 30 years (Ord. 1111, Art. 70). This pledge not to aggravate the tax burden

There's a World of Satisfaction

. . . for oil men the world over who rely on Mid-Continent Supply Co. for sure service, sure supply.

MID-CONTINENT SUPPLY CO.

THE WORLD'S LARGEST INDEPENDENT OIL FIELD SUPPLY COMPANY

Mid-Continent Building, Fort Worth, Texas

Export Division: 45 Rockefeller Plaza, New York 20, N. Y. Cable: MIDCUMPORT NYK

of concession grantees will be written in the standard convention.

GUARANTEED TRANSFER OF PROFITS: Both French and foreign investors are guaranteed the free transfer of profits and dividends from their Sahara operations in the same currencies they have invested in oil and gas exploration, production, and transportation (Ord. 1111, Art. 76). This pledge holds for the duration of the concession, and will also be written in the standard convention.

TAX SUMMARY
SAHARIAN REGIONS[1]
(Producing and Transportation)

Saharian tax legislation is the same as that in force in metropolitan France except for the following provisions:

ROYALTIES—CRUDE OIL—INLAND PRODUCTION *(Ordinance 58-1111 Art. 63):* Holders of mining titles are liable to a royalty determined by the application to the value of petroleum products at the well head of the following flat rates:

Crude oil	12.5%
Gas	5.00%

INCOME TAXES—GENERAL STRUCTURE—BASE *(Ordinance 58-1111 November 22, 1958 Art. 65):* The Saharian income tax is assessed at a 50% rate on the difference between the taxable profits as defined above under French metropolitan tax laws and the royalties, with an eventual possibility of carrying forward any excess of royalties over taxable profits against future profit-tax liability of the producers.

TRANSPORTATION—The 50% tax is assessed on the taxable profits deriving from transportation operations within Saharian regions *(ibidem Art. 69) (Ordinance 58-1111 of 1958 Art. 6¼):* Companies engaged in oil ventures in Sahara should create a separate branch of accounting over there for their producing and transportation activities.

ALLOWABLE DEDUCTIONS—DEPLETION *(Ordinance 58-1111 November 22, 1958, Art. 6¼, VII, 8° and Art. 66):* Producers may constitute a depletion reserve within the limits similar to those provided for by the French metropolitan tax law, but such a reserve is taxed at 50% after a five-year period or when it is distributed to shareholders prior to five years.

TRANSPORTATION: Not applicable.

ALLOWABLE DEDUCTIONS—INTERESTS *(Ordinance 58-1111 November 22, 1958 Art. 6¼ VII 4°):* An interest on borrowed capital is deductible if its rate does not exceed 8%, and in the case the borrowing firm is granted loans by its shareholders if the capital borrowed does not exceed the capital stock of the firm.

TRANSPORTATION: The same as for producing.

ALLOWABLE DEDUCTIONS—TAXES OTHER THAN INCOME TAXES *(Ordinance 58-1111 November 22, 1958 Art. 67 II):* As the Saharian tax régime is based on the principle of 50-50 profit sharing between producers and State, any increase on the existing taxes (such as registration duties, indirect taxes, real-estate taxes . . .) over 150% of their amount in November 1958 would be deductible, first from 50% income tax and then from the royalties.

TRANSPORTATION: The same as for producing.

TAX EXEMPTIONS—DIVIDEND TAX *(Ordinance 58-1111 November 22, 1958 Art. 67 and Ordinance 58-1113 November 22, 1958 Art. 1 and 2):* This 50% tax replaces all metropolitan French income taxes including the dividend tax on distribution of dividends deriving from producing activities in Sahara; in case beneficiaries of such dividends are French corporate bodies, the latter are exempted from any income tax thereon; they also are exempted from the dividend tax in the event of redistribution of those dividends to their own shareholders.

TRANSPORTATION: The same as for producing.

TAX EXEMPTIONS—TURNOVER TAXES—CUSTOM DUTIES *(Ordinance 58-1111 November 22, 1958 Art. 67 III Art. 68):* Equipment and services connected with the producing activities are exempted from turnover taxes and custom duties in case equipment comes from French territories or from abroad, but in the only event it is proved it is impossible to obtain such equipment within the French territories.

TRANSPORTATION: The same as for producing.

GUARANTEE FOR TAX STABILITY *(Ordinance 58-1111 November 22, 1958 Art. 70):* The stability of the present tax régime is guaranteed over the duration of about 25 years within a maximum of 30 years.

TRANSPORTATION: The same as for producing.

END

[1]Summary prepared by Louis Coignard, Asst. Tax Manager, Esso Standard S.A.F., Paris.

EGYPT

EXPLORATION: No discoveries of importance are known to have occurred in 1960.

Oil exploration and development activities in Egypt are mainly those of the General Petroleum Co., which is a purely Arab oil company, and CIE, Orientale des Pétroles d'Egypte (COPE), which is owned 51% by the International Egyptian Oil Co. (controlled by ENI and Petrofina) and 29% by the General Petroleum Authority and 20% by the Cooperative Socy. of Egypt.

The Egyptian Ministry of Industry circulated a document and map in 1960 containing an offer to admit companies to exploration in the Western Desert under rather restrictive terms. The grants are to be made under Art. 50 and 51 of Law 86 of 1956, which authorizes concessions under special terms and exempts from some provisions of the Mines and Quarries Law 66 of 1953.

A number of companies reportedly have applied for Western Desert exploration rights—including Phillips Petroleum, Sinclair Oil, Shell, ENI (Italian government), and Pan American International. No awards have been made as yet.

PRODUCTION: During 1960, production averaged 62,100 b/d. An Egyptian government official has estimated Egypt's crude output during the Second Five-Year Plan (in millions of metric tons) as follows: 1962—5.1 (about 102,000 b/d); 1963—6.9; 1964—7.86; 1965—8.52. For 1962 through 1964, surplus for export is estimated at 400,000 tons per year; for 1965, about two million tons.

TRANSPORTATION: There are no major crude-oil pipelines in Egypt, but transportation of oil is extremely important due to the Suez Canal. Egyptian management, under a capable director, Mahmoud Younes, has been successful in the canal's operation. It has followed through on a deepening and improvement program, while handling record transits. The Egyptian Suez Canal Authority stated in 1960 that the 10-year "Nasir" project to increase the canal's capacity and to deepen it will be completed on schedule. It will allow about 3,600,000 b/d to pass through the canal by 1965 and about 5,000,000 b/d by 1970.

EGYPT—Petroleum Traffic, 1958 and 1959
(Thousands of Tons)

	Northbound		Southbound	
	1958	1959	1958	1959
Crude oil	84,092	87,414	1,267	1,039
Petroleum products	10,309	11,307	1,109	1,455

REFINING: By 1963, Egypt's refining capacity should almost double—to 130,000 b/d from the present 70,000 b/d. In the same year, the country's crude capacity will rise to 138,000 b/d, and by 1965 to 170,000 b/d, according to the Egyptian Ministry of Industry. This expansion includes addition of 20,000 b/d to the 42,000 b/d capacity of the Suez refinery of Anglo-Egyptian Oilfields, Shell-BP affiliate.

OIL LAWS

No change occurred in Egypt's oil regulations during 1960, with the exception of the new regulations for the Western Desert.

For a detailed and highly recommended study of petroleum-industry legislation within Egypt, the editor highly recommends *"Petroleum Legislation."* This legislative reference service contains a summary and analysis of the oil laws and other industry regulation for Egypt, as well as every other major country of the world. The national sections are prepared by legal counsel highly recommended by oil companies who have actually operated within the country concerned. The same oil-law firms keep reviews up-to-date by loose-leaf revision service. For information on this recommended service, the publisher may be contacted directly at *Petroleum Legislation Ltd., P. O. Box 1591, Grand Central Station, New York 17, N. Y.*

EGYPT—Imports and Exports, 1959
(Thousands of Barrels)

	Imports	Exports[1]
Crude petroleum	11,336	7,483
Gasoline	179	892
Kerosine	2,906	423
Gas oil	835	30
Diesel oil	323	—
Residual fuel oil	2,887	22
Lubricants	335	—
Asphalt	1	107
Total	18,802	8,957

[1] Also 2,302,000 bbl of bunkers.

Source: American Embassy, Cairo, through the U. S. Department of State.

EGYPT—Suez Northbound Oil Traffic, 1959
(Millions of Tons)

Source		Destination	
Kuwait	48.4	United Kingdom	25.7
Iran	20.0	France	15.3
Saudi Arabia	11.2	Italy	14.9
Iraq	6.2	Netherlands	11.1
Qatar	5.2	Other Europe	21.8
Other	7.7	The Americas	9.9*
Total	98.7	Total	98.7

*Middle East oil transported to the Americas in 1958—10.5 million tons.

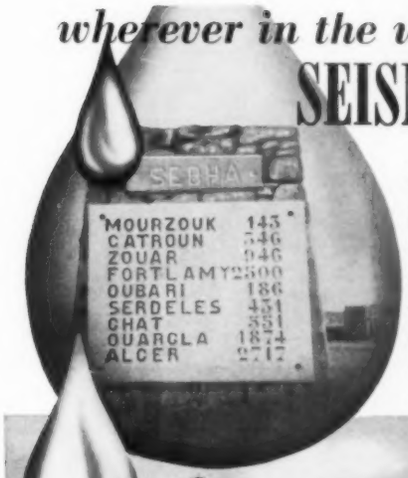
NATIONAL FACTORS

Taxation: A detailed study of taxation of petroleum in Egypt has been prepared, and will be available early in 1961 under the title *"International Taxation Series."* This series is devoted exclusively to petroleum taxation, covering every type of tax imposed on petroleum operations in all countries. Marketing, refining, transportation, exploration, and production taxes are covered, with a separate study of each. For an example of one of these national studies (all are prepared in exactly the same format), readers are referred to the OCRS section of this issue of *World Petroleum Report*, i.e., the section entitled French Sahara (OCRS)—*Petroleum Industry Taxation*. Requests for information on the entire series should be addressed to *International Taxation Series, P. O. Box 2744, Grand Central Station, New York 17, N. Y.*

END

wherever in the world you require

SEISMIC EXPLORATION



. . . whether at the crossroads of the Sahara, in the South American jungles, or on the desolate dunes of Australia, NAMCO is equipped, staffed, and experienced for rendering complete modern seismograph, gravity, magnetometer, core drilling, magnetic recording, and record section services.

For an exploratory discussion contact . . .

namco

INTERNATIONAL, INCORPORATED

LIBYA: Box 677 . . . Tripoli, Libya . . . Cable: Namco-Tripolibya
BOLIVIA: Casilla 1004 . . . Cochabama, Bolivia
U.S.A.: 2345 W. Mockingbird . . . Dallas 35, Texas
telephone FLeetwood 2-2671 . . . Cable: Namco-Daltex

NAMCO international NATIONAL McCOLLUM CONTINENTAL

an affiliation of:
NATIONAL GEOPHYSICAL COMPANY, INC.
P. O. Box 35501 . . DALLAS 35, TEX. . . FLeetwood 2-2671
E. V. McCOLLUM & CO.
515 Thompson Bldg. . . TULSA 3, OKLA. . . LUther 2-3149
CONTINENTAL GEOPHYSICAL CO.
1409 Continental Life Bldg. . . . FORT WORTH 2, TEXAS . . . EDison 2-9231

MOROCCO

EXPLORATION: For a map of concessions in Morocco, refer to *World Petroleum Report 1960*, p. 156.

A new oil law passed in July 1958 favored partnership between foreign interests and the State, and is based on the 50-50 principle of profit division. The Italian State corporation, ENI, concluded an exploration agreement in 1959 covering an area of about 11,580 square miles in the extreme south on the Atlantic coast, including the coastal waters. The agreement provided for the formation of a joint Italian-Moroccan company known as Ste. Marocaine Italiènne des Pétroles, on lines similar to those applying to SIRIP in Iran. In the spring of 1960, ENI commenced drilling on a location about 185 miles inland from Tarfaya. In the same area, Ambassador Oil Corp., of Texas, applied for a concession of about equal size. Other applications have been made by an associate of Wintershall. Pan American International has an exploration survey group at work also.

A second wildcat in Morocco was spudded in 1960 by ENI, 155 miles west of the first test on the Atlantic coast. ENI has denied the first well found oil, after industry rumors had circulated about a discovery.

Reserves: Estimated proved and recoverable reserves of crude petroleum are 10 million barrels. Natural-gas reserves are estimated at 20 billion cubic feet.

PRODUCTION: Crude-oil production in 1959 increased by 27.2% over the 1958 figure to 1,952 b/d. In 1960, production averaged about 2,100 b/d.

All current production is by Ste. Chérifiènne des Pétroles. SCP, holder of four permits aggregating 7,600 square miles in Zone 1 (northern Morocco) south of Tangier Development drilling at Haricha, has raised capacity there to 1,500 b/d. Production is from the Dogger sandstones (Jurassic).

TRANSPORTATION: There are no major crude lines in the country. A 5-in. gas line is being built from Haricha field eight miles to the Sidi-Kacem refinery, only one in Morocco.

REFINING: There are no refineries in Morocco at present. ENI is obligated to build a refinery under its recent contract (see *WPR 1960*), and site has been picked at Mohammedia on Atlantic coast, 19 miles from Casablanca, for a 25,000 b/d refinery by Ste. Anon. Maroc-Italiènne, jointly owned by Ente Nazionale Idrocarburi and Moroccan capital. Completion is scheduled for late 1962.

In partnership with the Moroccan government, Shell will build an $18 million 100,000-ton-per year ammonium-phosphate plant at the port of Safi, to use local natural gas and phosphates.

OIL LAWS

For a detailed study of petroleum-industry legislation and regulation within Morocco, the editor highly recommends "*Petroleum Legislation.*" This is a legislative reference service containing a summary and analysis of the oil laws and other industry regulation for Morocco, as well as every other country of oil interest. The national sections are prepared by law firms recommended by oil companies who have actually operated within the country concerned. The same oil-law firms keep their reviews up-to-date by loose-leaf revision service. For information on this excellent service, the publisher may be contacted directly at *Petroleum Legislation Ltd., P. O. Box 1591, Grand Central Station, New York 17, N. Y.*

NATIONAL FACTORS

Taxation: A detailed study of taxation of petroleum in Morocco has been prepared, and will be available early in 1961 under the title "*International Taxation Series.*" This series is devoted exclusively to petroleum taxation, covering every type of tax imposed on petroleum operations in Morocco. Marketing, refining, transportation, exploration, and production taxes are covered, with a separate study of each. For an example of one of these national studies (all are prepared in exactly the same format), readers are referred to the Colombia section of this issue of *World Petroleum Report*, i.e., the section entitled "*Colombia—Petroleum Industry Taxation.*" Requests for information on the entire series should be addressed to *International Taxation Series, P. O. Box 2744, Grand Central Station, New York 17, N. Y.*

The Investment Law of 13 September 1958 was amended in 1960. The amendment permits capital goods to enter free of duty when approved by the Investment Commission. Other features of the revised law include tax reductions and guarantees of profit remittance.

END

TUNISIA

There is no oil production or refining in Tunisia. A small gas field is being produced, however, and a refinery is planned.

EXPLORATION: Tunisia has had little success despite many years' effort. Jersey Standard, Shell, and Gulf have all participated in the search, but the only tangible result is a small gas production on Cap Bon, the northeastern-most projection of the country. Work has been continued by Ste. de Réchèrches et d'Exploitation des Pétroles en Tunisie (SEREPT), a French-Tunisian government organization which did no drilling in 1960. Sahara and Libya developments aroused new interest, and recently concessions have been granted to the Conorada Petroleum Corp. group, and to Rimrock International in conjunction with the Italian Soc. Oil Minerali. Conorada has a seismic party working (at the end of 1960), but has not drilled yet.

Early in 1960 Mobil International took a 50% interest in a 10-million-acre permit held by SEREPT in the south of the country, on which drilling is carried out by the latter as joint operator.

An agreement was signed in 1960 with ENI, the Italian government company, for construction of a 20,000 b/d refinery and exploration in southern Tunisia over areas relinquished by SEREPT. The Tunisian government is to supply half the estimated $10 million cost of the refinery—to be built at La Skhirra—which will be operated on a 50-50 basis. Oil will be purchased from the Edjélé pipeline, unless available at lower prices elsewhere. Tunisia will have a half-interest in the operating company, and will also pay half the exploration expenses if commercial production is found. It will then receive profits on the basis of 50% taxation of the original effort, plus half of net. A joint marketing company is also to be set up in the country.

PRODUCTION: Ste. de Réchèrches et d'Exploitation des Pétroles en Tunisie (SEREPT) continued to produce the small Cap Bon gas field in the extreme northeastern part of the country. Production in '60 was 6.7 million cubic meters.

TRANSPORTATION AND REFINING: A major pipeline crosses Tunisia, originating at a cluster of fields owned by the French-company CREPS, and terminating at La Skhirra on the Mediterranean coast.

There are no refineries other than the ENI proposed plant already mentioned.

OIL LAWS

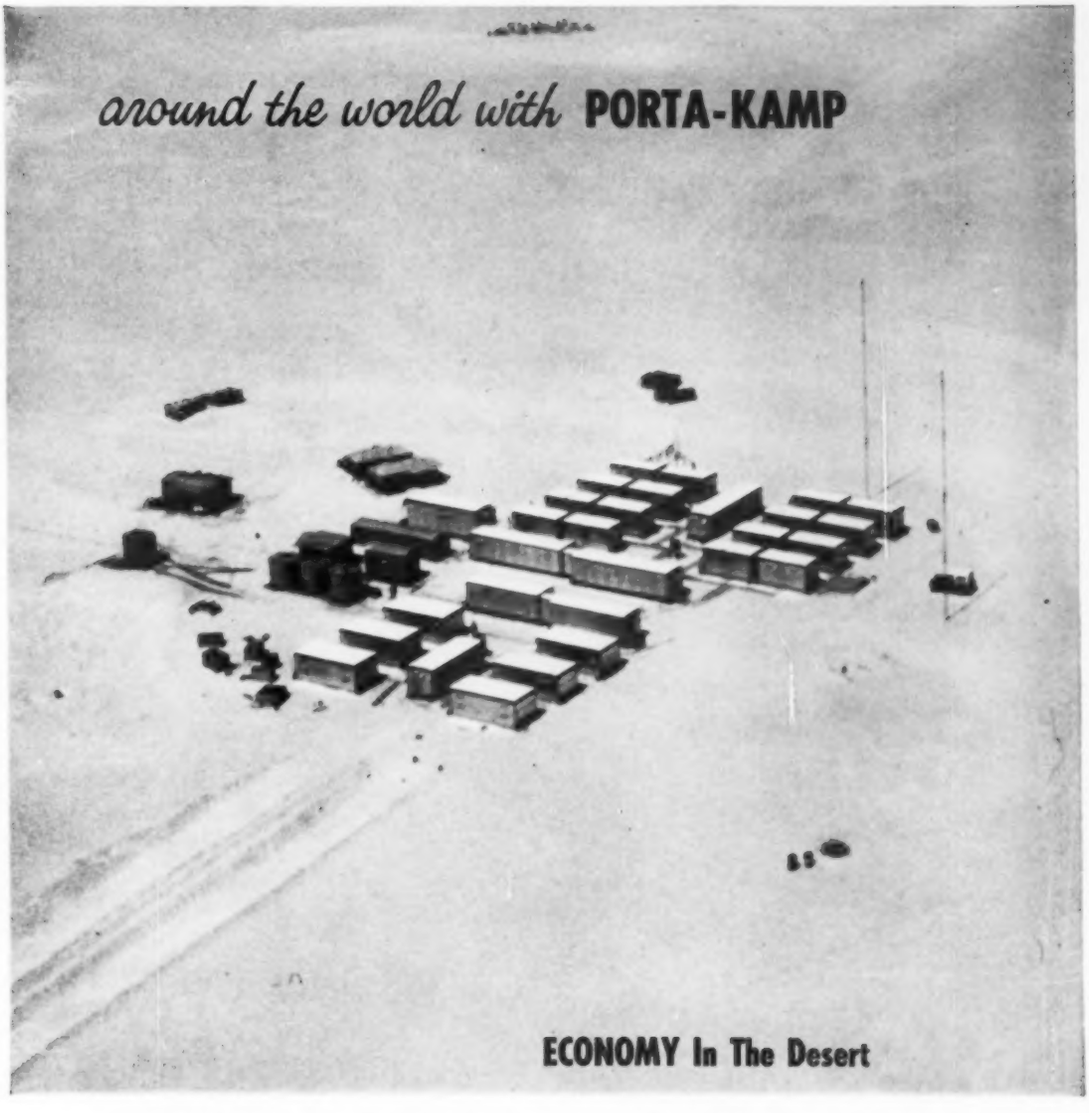
No major changes occurred in the Tunisian oil laws during 1960. For a résumé of the oil law, see *World Petroleum Report 1958*, p. 212.

For a detailed and highly accurate study of petroleum-industry legislation and regulation within Tunisia, the editor highly recommends "*Petroleum Legislation.*" This is a legislative reference service containing a summary and analysis of the oil laws and other industry regulation for Tunisia and every other country of oil interest in the world. The sections are prepared by law firms recommended by oil companies who have actually operated within the country concerned. The same oil-law firms keep their reviews up-to-date by loose-leaf revision service. For information on this excellent service, the publisher may be contacted directly at *Petroleum Legislation Ltd., P. O. Box 1591, Grand Central Station, New York 17, N. Y.*

NATIONAL FACTORS

A detailed study of taxation of petroleum in Tunisia has been prepared, and will be available early in 1961 under the title "*International Taxation Series.*" This series is devoted exclusively to petroleum taxation, covering every type of tax imposed on petroleum operations in Tunisia, as well as other oil countries. Marketing, refining, transportation, exploration, and production taxes are covered, with a separate study of each. For an example of one of these national studies (all are prepared in exactly the same format), readers are referred to the Colombia section of this issue of *World Petroleum Report*, i.e., the section entitled "*Colombia—Petroleum Industry Taxation.*" Requests for information on the entire series should be addressed to "*International Taxation Series,*" *P. O. Box 2744, Grand Central Station, New York 17, N. Y.*

END



Deep in the heart of the Libyan desert, there are complete, portable Porta-Kamp villages. The owners of these campsites saved almost 50% costs by using the world's largest producer of portable buildings, Porta-Kamp.

Porta-Kamp manufactures a complete line of buildings for every use whether in Africa, Alaska, Iran or Indonesia or whether for 3 men or 3,000 men.

Porta-Kamp villages and campsites dot the face of the earth.

We invite your inquiries for case histories.

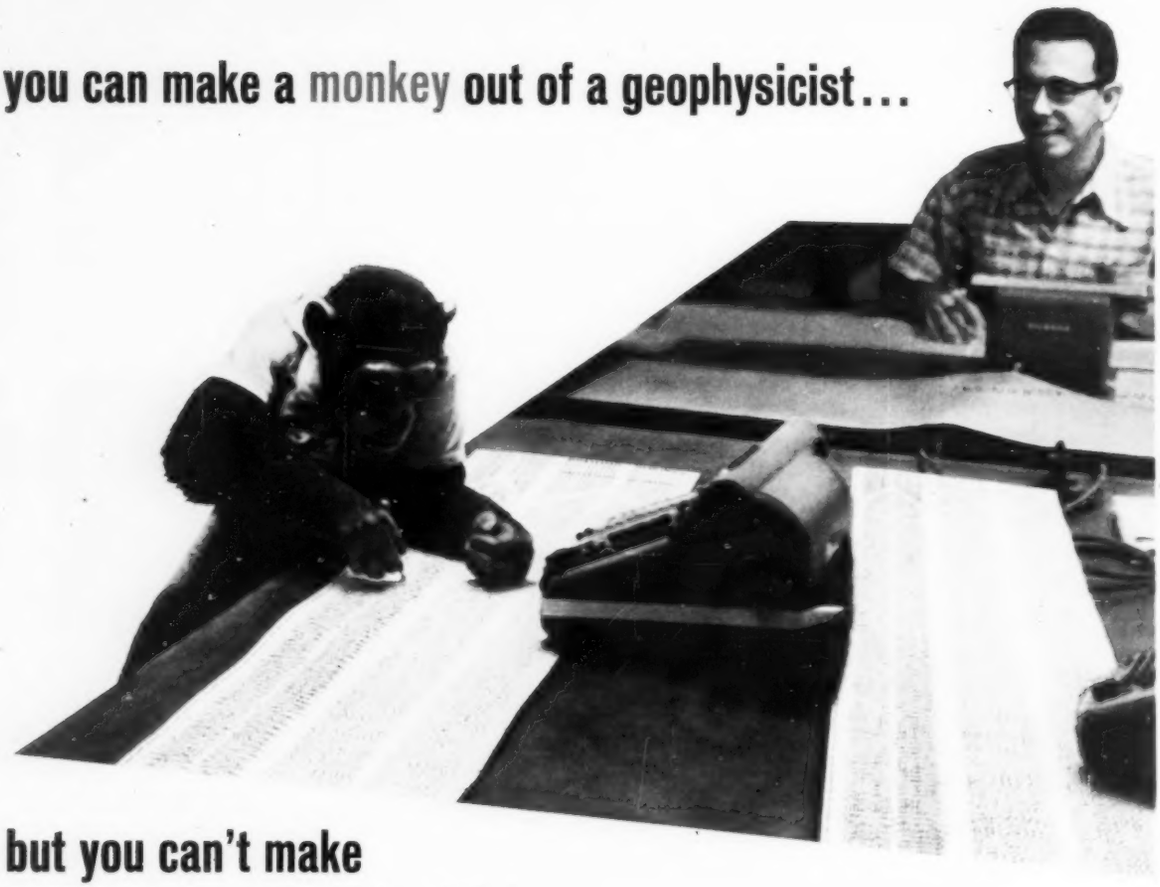
PORTA-KAMP HOUSTON

PORTA-KAMP MANUFACTURING COMPANY, INC.

P. O. Box 7084 3601 West 12th Street Houston, Texas

Cable Address: PORTAKAMP UNderwood 9-3294

you can make a monkey out of a geophysicist...



but you can't make a geophysicist out of a monkey!

It doesn't take a monkey to tell you that you get only what you pay for — in the geophysics field as in others.

One of our camp followers, Fidel by name, puts on a pretty good act among the record sections, slide rules, and delicate electronic equipment and looks sort of professional behind a desk.

Fidel might be taught to perform some fundamental chores with only an occasional banana break, but if any oilfields were discovered through his antics, they would be strictly accidental — and you can't afford to gamble on accidents.

The moral is this: Leave your geophysics to the proved professionals.

Rogers' crews, for example, go everywhere, have been practically everywhere. This kind of experience means you get the most for your money. And really, you cannot get a better price than that.

ROGERS *Geophysical Companies*

3616 WEST ALABAMA • HOUSTON, TEXAS

FOREIGN OFFICES

Caracas, Venezuela
Mogadiscio • Somalia
34 Ave. des Champs Elysees • Paris, France
1-3 Arlington St., St. James's • London 1, England
Madrid, Spain
Tripoli, Libya • Algiers • Tunis, Tunisia

ROGERS' CREWS GO EVERYWHERE

CENTRAL & SOUTH AFRICA

Oil and politics combined to put Africa in the middle of the stage during 1960. This section reviews only the central and southern parts of Africa; the seven countries of North Africa (Spanish Sahara, Morocco, Algeria, French Sahara, Libya, Tunisia, and Egypt) are reviewed under North Africa.

OIL LAWS

No major changes occurred in the oil regulation of Africa's central and southern countries during 1960.

Entire text of the African oil legislation has been published in a noteworthy collection, *"South and Central Africa—Basic Oil Laws and Concession Contracts."* It is a word-for-word compilation of applicable laws, an interesting and useful collection which includes oil regulation for the other countries of South and Central Africa as well. For information, address the publisher directly: *Petroleum Legislation Ltd., P. O. Box 1591, Grand Central Station, New York 17, N. Y.*

NATIONAL FACTORS

Oil Taxation: A detailed study of taxation of petroleum in major countries of South and Central Africa has been prepared, and will be available early in 1961 under the title of *"International Taxation Series."* This series is devoted exclusively to petroleum taxation, covering every type of tax imposed on petroleum operations in all countries. Marketing, refining, transportation, exploration, and production taxes are covered, with a separate study of each. For an example of one of these national studies (all are prepared in exactly the same format), readers are referred to the Colombia section of this issue of WORLD PETROLEUM REPORT, i.e., the section entitled "Colombia—Petroleum Industry Taxation." Requests for information on the entire series should be addressed to *"International Taxation Series," P. O. Box 1591, Grand Central Station, New York 17, N. Y.*

END

ANGOLA

EXPLORATION: Petrofina has continued exploration; and during the first half of 1960 drilled 12 wells, including five core-drill tests. Estimated total for 1960 is 23 wells, including eight core-drill tests. No discoveries were reported.

Gulf Oil Corp. is exploring in the exclave of Cabinda, far in the north of Angola. A stratigraphic drilling program, commenced in the latter part of 1959, continued with the drilling of several deeper holes during January and February of 1960—with several reaching a layer of anhydrite in which minor oil shows were noted.

PRODUCTION: Production in Angola is derived from three fields: Benfica, Luanda, and Cacuaco. The latter was discovered in 1958, and has only two producing wells. The crude produced has an average gravity of 27 API.

At Benfica and Luanda, production comes from limestone, respectively, at 7,500 ft and 5,700 ft, and at Cacuaco from sand and conglomerate at a 7,000-ft depth.

Production during 1960 averaged about 1,300 b/d, according to Petrofina. This contrasts with 953 during 1959.

TRANSPORTATION: A 3 to 4-in. pipeline has been built from the Galinda oil field to the refinery in Luanda. Petrangol reported the pipeline ready for use in April 1960.

A 3-in. pipeline was built between Cacuaco and Luanda during 1960.

REFINING: There is only one refinery, that of Petrangol (Petrofina affiliate) which is located at Luanda Bay. Capacity was increased on April, 1960, to 180,000 tons yearly (about 3,600 b/d), although this plant might run 4,000 b/d under certain conditions. Cia. de Petroleos de Angola (Petrangol) is owned 56% by Portuguese and 44% by Belgian interests.

OIL LAWS

For a citation of applicable laws, see *World Petroleum Report 1959*, p. 121. The only new laws in 1960 was a new regulation covering the movement of petroleum products in Angolian ports. The new Regulation has been published in the *Boletin Official*, Series 1, No. 21.

Entire text of the Angola's oil legislation has been published in *"South and Central Africa—Basic Oil Laws and Concession Contracts,"* a word-for-word compilation of applicable laws which includes oil regulation for all the other countries of South and Central Africa as well. For information, address inquiries to the publisher directly: *Petroleum Legislation Ltd., P. O. Box 1591, Grand Central Station, New York 17, N. Y.*

NATIONAL FACTORS

For a review of factors affecting investment, see *World Petroleum Report 1959*, p. 121. The factors listed there have not changed; however, agitation for independence has grown under the stimulus of events in the Congo, particularly pressure by the late Congolese Premier, Patrice Lumumba. An independence movement, the Angola People's Union, has been formed which advocates complete independence from Portugal, the colonial administrator.

END

CONGO (Leopoldville)

The Congo gained wide publicity when granted its independence from Belgium at mid-year 1960, along with political unrest. There was some oil activity, however, under the Congo's 1959 mining degree which regulates hydrocarbon exploration and development. In June 1959, a pact was signed by Forminière and Pétrobèlge granting these companies oil exploration rights on 1,700 square miles in the Belgian Congo portion of the Congo basin.

Another company—owned 72.5% by Gulf Oil and the remainder by SYMAF, a Belgian mining firm—has been negotiating for an offshore concession. As of mid-1960, the concession boundaries had not been fully defined, however.

During July 1960, a very wide concession was to be given to Congo International Management Corp. (CIMCO), managed by L. Edgar Detwiler. CIMCO, with offices at 67 Wall Street, New York, was organized to develop "mining, oil, gas, and hydroelectric power." The contract was signed under the administration of Patrice Lumumba. It is not believed to have been ratified by the parliament, and is not now in effect.

Reserves: No oil reserves are known to exist; however, gas reserves are believed to exist in Lake Kivu in the vicinity of two trillion cubic feet. They are not being developed for lack of markets.

OIL LAWS

The entire translated text of the Congo's oil legislation has been published in a noteworthy collection, *"South and Central Africa—Basic Oil Laws and Concession Contracts."* It is a word-for-word compilation of applicable laws, an interesting and useful collection which includes oil regulaton for the other countries of South and Central Africa as well. For information, address inquiries directly to the publisher, *Petroleum Legislation Ltd., P. O. Box 1591, Grand Central Station, New York 17, N. Y.*

END

CAMEROONS (FRENCH)

Word has been received from the company, SEREPCA (Ste. de Recherches et d' Exploitation des Petroles du Cameroun) that operations have been discontinued since February 1959, despite KW1 well which tested 666 cubic meters of oil at the beginning of 1959.

The company stated in its Annual Report for 1959 that they consider the area highly potential, especially since some years ago a gas reserve of 400 million cubic meters was found at Logbaba.

SEREPCA is now looking for U.S. participation. It holds exploration permits over the entire 3,475 square miles of the Cameroun's sedimentary basin but is putting its entire effort into the Sahara. It was disclosed that the type of 50% interest another French company arranged with Shell and Socony in Gabon is preferred, with an American associate that has experience in stratigraphic fields and that is well equipped technically and financially. Serepca is likely to ask the U.S. firm to take into account its past

investment in Cameroon exploration.

Almost every well drilled by the company has shown oil or gas, though not in commercial quantities. Serepca has already turned up gas fields at Logbaba and Bomono, and had promising crude shows at Souellaba and Kwa-Kwa.

OIL LAWS

Entire text of oil legislation in the Cameroons has been published in a noteworthy collection, *"South & Central Africa—Basic Oil Laws and Concession Contracts."* It is a word-for-word compilation of applicable laws, an interesting and useful collection which includes oil regulation for the other countries of South and Central Africa as well. For information address inquiries directly to its publisher, *Petroleum Legislation Ltd., New York.* END

ETHIOPIA

EXPLORATION: The only concession presently in force is held by Gewerkschaft Elwerath, a German company in which Jersey Standard and Shell have very small interests. For a description of its area and a map, see *World Petroleum Report 1961.* No drilling was done in 1960.

PRODUCTION, REFINING, MARKETING: There is no production or refining. An agreement with the USSR for construction of a 10,000 b/d refinery at the Rea Sea port of Assab was reportedly cancelled by the emperor in 1960 on the grounds it would make the country too dependent on Russian crude. The construction of the refinery was only a means toward economic penetration in any case, since the country's total consumption is less than 2,000 b/d.

Four companies, Shell, SEPS, BP, and AGIP, market in the country. The Italian-owned AGIP is expanding its activities, and has about 30 sales outlets now; hopes to have 55 by the end of 1962.

OIL LAWS

The basic regulation of the country originates with the emperor; negotiations are very slow and tedious, since his permission must be received for all agreements.

Entire text of the former Sinclair concession has been published in a noteworthy collection, *"South and Central Africa—Basic Oil Laws and Concession Contracts."* It is a word-for-word compilation of applicable laws, an interesting and useful collection which includes oil regulation for the other countries of South and Central Africa as well. For information, address the publisher directly: *Petroleum Legislation Ltd., P.O. Box 1591, Grand Central Station, New York 17, N. Y.*

NATIONAL FACTORS

Despite a revolt in the closing months of 1960, the régime of Emperor Haile Selassi appears as strong as ever. END

GABON

Exploration continued during 1960 on the permits held by SPAFE (initials changed from SPAEF early in 1960), by Shell, and by Socony.

The SPAFE-Congo permit is divided into three parts: from the Kouilou River south to the Cabinda border—SPAFE 100%; from the Kouilou River north to Mayumba—SPAFE 50%, Mobil 50% (SPAFE operator); offshore—SPAFE 50%, Mobil 50% (Mobil operator).

One of the SPAFE permits in which Mobil holds an interest had in December 1960 its fourth discovery in the Gabon—at Assewe. On initial test, two zones produced 12.5 bbl per hour between 2,670 ft and 2,860 ft. A third zone initially produced 4.7 bbl per hour at 3,720 ft. The well has not as yet been fully evaluated, and drilling continues.

The intercompany agreement between two affiliates of Mobil International Oil Co. and Ste. des Pétroles de l'Afrique Equatoriale Francaise (SPAFE) calls for an expenditure of $45 million for Mobil's program (with a minimum of $22.5 million) during the six-year period of their agreement with SPAFE, which covers 6,175,000 acres in the Gabon and Congo republics. A discovery was made at Rembo Kotto No. 1 in 1959; and the Mobil affiliates, Mobilrex and Mobil Exploration Equatorial Africa Inc., hold a 50% interest in the discovery.

Oil was also discovered in the first stepout to the Rembo Kotto discovery well. Located about 1,500 ft south of the discovery, the new well, on a one-hour drill-stem test, flowed 9 bbl of high-gravity crude from a section between 1,949 ft and 1,973 ft on a ¼-in. choke. Pay section is at about the same level as Rembo Kotto discovery.

Application for a 1,450-square-mile offshore exploration permit was made in 1960 by Shell and its French partner, SPAFE, adjacent to their joint onshore concession. Shell will be operator for the offshore tract.

Reserves: Reserves within the Gabon and Congo areas of SPAFE were estimated by the company, on October 20, 1960, at 40 million cubic meters (252 million barrels) at the beginning of production. Estimated recoverable reserves under present-day techniques and prices are 10 million metric tons (equivalent to about 70 million barrels) of which two million tons had been extracted by the end of September 1960. Present reserves are, therefore, estimated at approximately 56 million barrels.

PRODUCTION: Crude-oil production in Gabon and Middle Congo has risen steadily. It averaged 9,700 b/d in 1958, 14,600 b/d in 1959, and rose to 18,500 b/d in 1960. It is estimated by the company that production will level off at about this level, and sales of production at that level have been made until 1962.

In 1960, SPAFE stated production in its Pointe-Indiénne field, first in this republic, formerly the French Middle Congo. The field has a capacity of about 2,000 b/d.

REFINING AND MARKETING: There is no refinery in Gabon, and none is planned so far as was known at the end of 1960. Marketing needs are very small, with all products imported.

OIL LAWS

Complete translated text of Gabon's oil legislation has been published in a noteworthy collection: *"South and Central Africa—Basic Oil Laws and Concession Contracts."* It is a word-for-word compilation of applicable laws, an interesting and useful collection which includes oil regulation for the other countries of South and Central Africa as well. For information, address the publisher directly: *Petroleum Legislation Ltd., P. O. Box 1591, Grand Central Station, New York 17, N. Y.* END

GHANA

No activity in petroleum exploration has been reported for 1960. For a concession map of Gulf Oil's holdings, please refer to *World Petroleum Report 1960.* The government carried out an aerial survey (photographing), and later will survey some 6,500 square miles by aerial magnetometer and scintilometer.

PRODUCTION, REFINING, MARKETING: There is no local production of crude oil. During late 1960, the Italian government's ENI signed an agreement with the government of Ghana for construction of a 24,000 b/d refinery—ultimate capacity to be 40,000 b/d, with later expansion. Location is to be near Tema.

A 1960 agreement between the Soviet Union and Ghana provides for the delivery of Soviet petroleum products, the granting of a 160 million ruble credit for the purchase of machines and instruments necessary for the oil search, and the sending of Soviet geologists to Ghana to conduct oil geological prospecting.

OIL LAWS

Entire text of Ghana's oil legislation has been published in a noteworthy collection, *"South and Central Africa—Basic Oil Laws and Concession Contracts."* It is a word-for-word compilation of applicable laws, an interesting and useful collection which includes oil regulation for the other countries of South and Central Africa as well. For information, address the publisher directly: *Petroleum Legislation Ltd., P. O. Box 1591, Grand Central Station, New York 17, N. Y.*

NATIONAL FACTORS

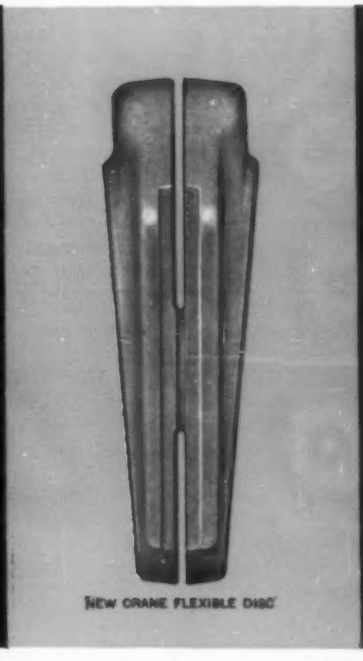
The government denied during 1960 reports that Ghana is planning to nationalize foreign companies. President Nkrumah moved to scotch these as "wicked" rumors but, nevertheless, described himself as a "Marxist Socialist" and declared his country intends to find its way to socialism. END

ERITREA

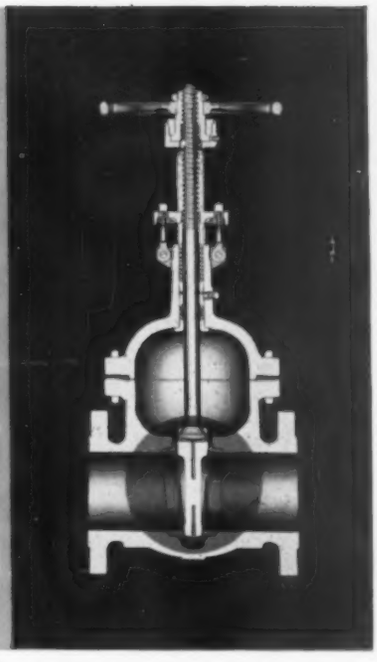
There is no petroleum activity reported. The only petroleum concession is held by the Italian government through AGIP Mineraria. For a map of the area see World Petroleum Report 1960. END

PROOF OF QUALITY

Every Crane product is checked for quality at every step of its production. Crane maintains the industry's most complete facilities for engineering, manufacturing and testing its products.



NEW CRANE FLEXIBLE DISC



New CRANE FLEX GATES eliminate sticking in oil operations... operate with less torque . . . outperform any conventional gate valve now in use

Crane Flex Gates are the most significant advance in gate valve design in 25 years! Instead of being made with a solid disc, Flex Gates have separate disc faces that flex slightly when seat faces are joined. This flexibility allows them to conform to the new position and compensates for any minor seat misalignment due to pipeline deflections.

Flex Gates can't stick when closed—even if closed while hot and allowed to cool. They stay tight on both faces over a wide range of pressures. Minimum operating torque is assured for both seating and unseating. Because they're flexible, body seat rings and faces can be serviced economically and quickly.

In some services one Flex Gate does the work of 2 conventional gate valves—saving substantially on piping costs. Extensive field tests show that Crane Flex Gates outperform any conventional solid wedge disc valve now in use.

They are ideally suited for oil, oil vapor, gas, steam or water service. Stem and disc seating faces are Crane Exelloy. Shoulder-type seat rings are Exelloy or Crane No. 49 Nickel Alloy. Where hard facing material for high temperature-pressure service is required, Stellite seat facings can be furnished.

For complete information on this new line of gate valves call your Crane Representative. Crane International makes available to you a complete line of valves from the source most desirable to you—based on price, geographical location and service.

VALVES · ELECTRONIC CONTROLS · PIPING · PLUMBING · HEATING · AIR CONDITIONING

CRANE®

INTERNATIONAL

International Headquarters 60 East 42nd Street, New York 17, New York, U.S.A.

MANUFACTURING IN

U.S.A. CANADA ENGLAND FRANCE HOLLAND ITALY

K5

IVORY COAST

EXPLORATION: Work in this newly independent republic slowed down during 1960 when Plymouth Oil and its Benedum-Trees associates withdrew from exploratory drilling in the Ivory Coast, in which they had a 39% interest with Ste. Africaine des Pétroles. The French company will continue operations, reimbursing out of any further production the amount expended by the American interests in connection with the project.

PRODUCTION, REFINING, MARKETING: There is no production of crude oil. Neither is there any refinery. The country's small requirements are supplied by imports, mainly from French sources.

OIL LAWS

There is no fiscal regulation for hydrocarbons in the Ivory Coast, but such regulation has been requested by SAP, and it is expected to be passed during 1961. This legislation will be patterned after the law on investments of September 3, 1959, under the "long-term fiscal arrangements" clause which contains certain exemptions and regulation based on common law. Petroleum exploration companies are among those mentioned as destined for the benefits of this law, under arrangements to be negotiated and adapted to their activities.

Complete text of the Ivory Coast's oil legislation has been published in a noteworthy collection, *"South and Central Africa—Basic Oil Laws and Concession Contracts."* It is a word-for-word compilation of applicable laws, an interesting and useful collection which includes oil regulation for the other countries of South and Central Africa as well. For information, address the publisher directly: *Petroleum Legislation Ltd., P. O. Box 1591, Grand Central Station, New York 17, N. Y.*

NATIONAL FACTORS

In pursuance of an agreement signed in Paris in mid-July, the Ivory Coast (formerly a member of the French Overseas Community) declared itself an independent nation. END

KENYA

EXPLORATION: Three oil companies are operating in Kenya: The BP-Shell Petroleum Development Co. of Kenya Ltd., Frobisher Ltd., and N.M. Mehta (Mehta Oil Exploration Co. Ltd.)

During 1960 BP-Shell carried out extensive geological and geophysical explorations in its areas, drilled a stratigraphic well in O.E.L. No. 1 and began another. The Frobisher Co. carried out geological work and is about to begin geophysical testing. The work done by the Mehta Co. has been entirely geological. No drilling in an actual search for oil has yet been carried out.

PRODUCTION, REFINING, MARKETING. There is no crude production. No refineries presently exist in the country, however in September 1959 agreement was reached between Consolidated Petroleum Co. and the Kenya government for an oil refinery to be built at Mombassa. Shell and BP share the $45 million cost of the new 22,000 b/d plant. It will serve Kenya, Uganda and Tanganyika. Crude will come from the Persian Gulf.

OIL LAWS

The oil laws of Kenya have been published in a legislative reference service known as *Central and South Africa—Basic Oil Laws and Concession Contracts".* It is available through its publisher, *Petroleum Legislation Ltd., Post Office Box 1591, Grand Central Station, New York 17, New York.* The compilation is complete and kept up to date by the addition of new legislation in the form of bound supplements to the original volumes. END

LIBERIA

EXPLORATION: An exploration license over about 1.5 million acres was granted during 1958 to American-Liberian Exploration Co., headed by R. H. Robinson, of Oklahoma City, USA. Some reconnaissance geological work was reported in 1959, but the concession was reported cancelled in 1960.

PRODUCTION, REFINING, MARKETING: There is no production or refining of crude oil. Marketing needs were 14,387,000 imperial gallons in 1958, an increase from 13,256,000 gallons in 1957. Needs in 1959 are reported to have increased 20% over 1958, and consumption is estimated to increase fourfold or more by 1965, according to USA consular reports based on importer data.

Marketing is shared by Mobil Oil, Texaco, Shell, and British Petroleum—in that order. END

LIBERIA—Imports, 1959
(Thousands of Barrels)

	Gasoline	Kerosine	Gas, diesel, and other fuel oils	Lube oils	Total
United States	62	89	18	5	174
United Kingdom	2	—	—	1	3
Iraq	84	10	112	1	207
Other	1	1	—	—	2
Total	149	100	130	7	386

Source: "Department of Agriculture and Commerce," Monrovia, 1959, through U. S. Department of State.

MADAGASCAR

EXPLORATION: The French island of Madagascar has a sedimentary strip along the west coast whose asphalt seepages have attracted attention. A light drilling rig was imported by a French company in the 1930's, and some test holes were drilled without result. Work ceased with the war. Afterwards, Ste. des Pétroles de Madagascar obtained a concession over the whole 65,500 square-mile area, and seismic and geological parties undertook extensive surveys. These are continuing, and two rigs are drilling.

Ste. des Pétroles de Madagascar in 1960 continued with one heavy and one light rig in use. The Morondava basin was being explored.

No discoveries were reported in 1960.

PRODUCTION, REFINING, MARKETING: There is no production or refining. Marketing needs are small, estimated at about 2,700 b/d during 1960.

OIL LAWS

Complete text of Madagascar's oil legislation has been published in a noteworthy collection: *"South and Central Africa—Basic Oil Laws and Concession Contracts."* It is a word-by-word compilation of applicable laws, an interesting and useful collection which includes oil regulation for the other countries of South and Central Africa as well. For information, address the publisher directly: *Petroleum Legislation Ltd.* END

MOZAMBIQUE

EXPLORATION: Exploration is under way by the Gulf-Standard (Indiana) combine, with one geological crew and four geophysical parties. No wells were drilled in 1960.

An over-water seismic survey was carried out in the early part of 1960 in the vicinity of Bazuruto Island and selected coastal areas. On land, seismic work is being done in the Sul do Save area and near the Zambezi River. By the end of April, the over-water survey had been completed, but survey work continues on land.

REFINING: Mozambique's first refinery will be built by Procon (Great Britain) Ltd., under contract to a subsidiary of a Portuguese oil marketing company, Soc. Nacionale de Petroleos. The 12,000 b/d plant, slated for completion early in 1961 at Lourenco Marques, will process Middle East crude. Construction began on November 3, 1959.

OIL LAWS

Complete text of the Mozambique oil legislation has been published in a noteworthy collection: *"South and Central Africa—Basic Oil Laws and Concession Contracts."* It is a word-for-word compilation of applicable laws, an interesting and useful collection which includes oil regulation for the other countries of South and Central Africa as well. For information, address the publisher direçtly: *Petroleum Legislation Ltd., P. O. Box 1591, Grand Central Station, New York 17, N. Y.*

NATIONAL FACTORS

A detailed study of taxation of petroleum in Mozambique has been prepared and will be available early in 1961 under the title *"International Taxation Series."* This series is devoted exclusively to petroleum taxation, covering every type of tax imposed on petroleum operations in all countries. Marketing, refining, transportation, exploration, and production taxes are covered, with a separate study of each. For an example of one of these national studies (all are prepared in exactly the same format), readers are referred to the OCRS section of this issue of *World Petroleum Report*, i.e., the section entitled *"French Sahara—Petroleum Industry Taxation."* Requests for information on the entire series should be addressed to *International Taxation Series, P. O. Box 1591, Grand Central Station, New York 17, N. Y.* END

WORLD-WIDE

DRILLING CONTRACTORS

SANTA FE DRILLING COMPANY

SANTA FE DRILLING COMPANY

P. O. BOX 310, WHITTIER, CALIFORNIA

CABLE "SFEDRLCO"

TELEPHONE OXbow 6-1175

DO YOU KNOW THESE IMPORTANT FACTS ABOUT

SANTA FE DRILLING COMPANY?

Whatever the scope of your drilling operations, the Santa Fe organization is staffed and equipped to handle your program on a complete "turn-key" basis... or can handle any individual portion of your overall program.

The Santa Fe Drilling organization is truly *world-wide* in the experience it offers, having conducted major drilling programs in *all* of the six principal continents.

Moreover, Santa Fe has had first-hand drilling and development experience in twenty-five different countries—from the frozen areas of the antarctic to the humid jungles of the equator, from high mountains to flat desert wastes.

No matter what the nature of *your particular* overseas drilling requirements, it will pay you to investigate the important savings you can make by utilizing the *world-wide* "know-how" available from Santa Fe Drilling Company. A letter, wire or telephone call places this valuable experience at your service!

NIGERIA

Shell-BP Activities in Nigeria—1960

EXPLORATION: The Shell-BP Petroleum Development Co. of Nigeria Ltd., jointly owned by Shell Petroleum Co. Ltd and BP Exploration Co. Ltd., on November 1, 1960, after having surrendered its former acreage in the British Trusteeship territory of the Southern Cameroons, was holding 22,361 square miles of acreage in western and eastern Nigeria.

In the period January 1 to November 1, 1960, a total of 19 exploration wells was drilled, of which 10 discovered oil. In the same period seven appraisal wells were completed, of which four were oil producers.

Exploration in 1960 was concentrated on the Niger delta area. Following the important discovery of oil at Ughelli in western Nigeria in 1959, other discoveries were made at Isoko and Patani, also in western Nigeria. The deepest successful oil well in Africa so far was drilled at Nun River in the center of the delta. This well reached a depth of 14,558 ft, and was suspended in August 1960.

Other Company Activities: Mobil Exploration of Nigeria (Mobil International Oil affiliate) abandoned its first test in southwestern Nigeria in 1960. Bottomed at 7,051 ft, the test was a "strat" begun after four years of preliminary exploratory work.

Tennessee Gas Transmission was granted exploration licenses on April 1, 1960, over 1.2 million acres on the Gulf of Guinea, east of Lagos. It is subject to finalization of the form of oil prospecting license, which has not been revised yet following promulgation of new regulations for oil some time ago.

Gulf Oil and American Overseas, the latter an affiliate of California Standard and Texaco, have entered applications for tracts in the offshore area which was opened January 1, 1960. The areas for which they applied are shown on the accompanying map, and are labeled "C," "D," "E," and "F." Amoseas applied for most of "E" and "F," and Gulf for most of "C" and "D."

PRODUCTION: By the end of 1960, production was up to about 35,000 b/d, and a Shell official has predicted Nigeria's output may reach 10 million tons yearly (about 200,000 b/d) by 1970. 1960 output averaged 17,350 b/d.

Shell-BP is the only producer; and for oil fields—Oloibiri, west of Port Harcourt, Afam, Bomu, and Ebubu, east of Port Harcourt—are at present in production. The average production from these fields during 1960 is estimated at 17,350 b/d, which compares with an average production of 11,223 b/d in 1959. The bulk of the production at present comes from the Bomu field. For the time being, the crude is exported from Port Harcourt which is linked by pipelines to the producing fields.

NIGERIA—Shell-BP Wells Drilled, January through November 1960

Well	Location	Total Depth (Feet)	Results
Exploration Wells			
Midim 1	Annang Province	9,376	Abandoned
Utapate 1	Uyo Province	10,356	Abandoned
Akassa Creek 1	Yenagoa Province	12,385	Abandoned
Oza 1	Umuahia Province	10,757	Tested oil
Kwa Ibo 1	Uyo Province	9,500	Abandoned
Santa Barbara 1	Yenagoa Province	12,003	Tested oil
Dimneze 1	Owerri Province	10,512	Abandoned
Opobo South 1	Uyo Province	11,250	Abandoned
Buguma Creek 1	Degema Province	12,195	Tested oil
Patani 1	Delta Province	12,054	Tested oil
Romas Creek 1	Delta Province	14,020	Abandoned
Udeduma Creek 1	Degema Province	12,492	Abandoned
Isoko 1	Delta Province	14,024	Tested oil
Apara 1	P. Harcourt Province	12,000	Tested oil
Nun River 1	Yenagoa Province	14,558	Tested oil
Elepa 1	Yenagoa Province	12,640	Tested oil
Soku 2	Degema Province	12,022	Suspended
Agbada 1	P. Harcourt Province	12,020	Tested oil
Ughelli 2	Delta Province	13,834	Tested oil
Appraisal Wells			
Bomu 14	P. Harcourt Province	6,517	Tested gas
Bomu 15	P. Harcourt Province	7,615	Tested oil
Bomu 16	P. Harcourt Province	7,642	Abandoned
Imo River 2	Owerri Province	9,679	Tested oil
Imo River 3	Owerri Province	8,985	Tested oil
Ebubu 5	P. Harcourt Province	9,000	Tested oil
Elelenwa 2	P. Harcourt Province	11,000	Abandoned

REFINING: There is no refinery at present. However, Shell and BP announced during 1960 agreement in principle to build jointly a $33.6 million refinery of "up to 20,000 b/d" capacity, probably at Port Harcourt, to supply the local market. Completion is set for 1963.

A local import-export firm, Victory West African Agencies, in Lagos, has applied for a permit covering 52 acres for construction of a refinery but it is not connected with Shell-BP in any way.

OIL LAWS

Discussions between government and company representatives are still under way after having gone forward all during 1960 on the model license and lease forms, which are to be used in the country. Shell-BP, as the first company in the country, has already signed its operating agreement, with leases for 30 years and right of renewal for an additional 30 years.

The oil legislation of Nigeria is reviewed extensively in a legislative reference service entitled *"Petroleum Legislation."* Compiled within Nigeria by the government representatives there, it reviews oil regulation very closely, and is highly recommended. The service covers all other countries in a series of volumes, each review compiled by legal counsel within the country concerned. Information regarding the series is available from the publisher, *Petroleum Legislation Ltd., P. O. Box 1591, Grand Central Station, New York 17, N. Y.*

NATIONAL FACTORS

Nigeria became an independent State on October 1, 1960, after a period of preparation under British officials. The country has been stable, despite friction between the Northern and the two other regions. For a review of Nigerian history and the government's attitude toward foreign investment (which is favorable), see WORLD PETROLEUM REPORT 1960, P. 130.

A detailed study of taxation of petroleum in Nigeria has been prepared, and will be available during early 1961 under the title *"International Taxation Series."* This series is devoted exclusively to petroleum taxation, covering every type of tax imposed on petroleum operations in all countries as well as Nigeria. Marketing, refining, transportation, exploration, and production taxes are covered—with a separate study of each. For an example of one of these national studies (all are prepared in exactly the same format), readers are referred to the Colombia section of this issue of WORLD PETROLEUM REPORT, i.e., the section entitled *"Colombia—Petroleum Industry Taxation."* Requests for information should be addressed to *"International Taxation Series," P. O. Box 1591, Grand Central Station, New York 17, N. Y.*

END

PORTUGUESE GUINÉ

EXPLORATION: Esso Exploration Guiné Inc.* is the only exploring company. Under a five-year contract, the company reportedly is committed to spend a minimum of $11 million. The company did no drilling during 1960, but planned to spud in an exploratory well about the end of 1960 or beginning of 1961. Drilling and Exploration Co. has a contract for supervision and technical work.

Esso performed about 20 crew-months of seismic work during 1960, having finished a gravity survey in February of that year.

PRODUCTION, REFINING MARKETING: There is no production or refining. Marketing needs are very small, all imported. END

*Text of the Esso concession is available from *Petroleum Legislation Ltd., P. O. Box 1591, Grand Central Station, New York 17, N. Y.*

MALI REPUBLIC

No exploration report has been received on this area (formerly known as Sudan Republic; *not* to be confused with the Sudan formerly Anglo-Egyptian Sudan, on the east coast). END

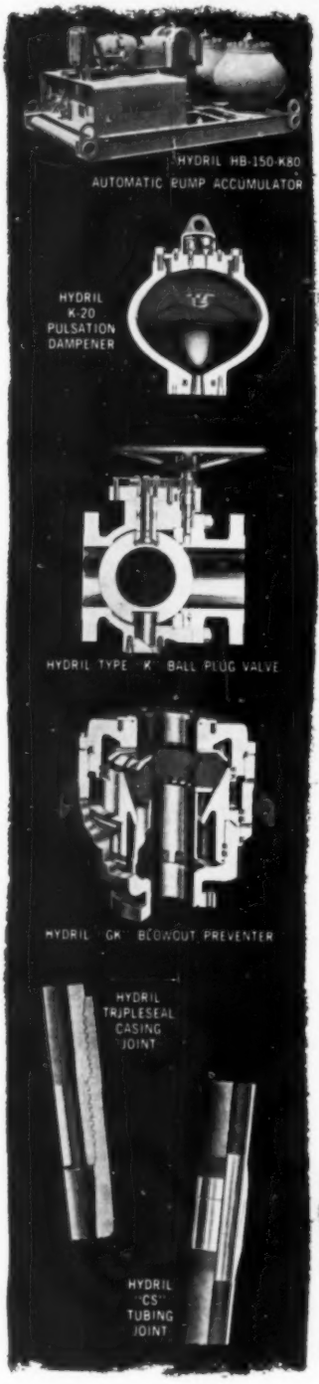
NIGER

EXPLORATION: In November 1959 Standard Oil Company (New Jersey) received a six-month prospecting license covering virtually the entire sedimentary area of Niger.

A protocol signed May 8, 1959 between France and Niger, grants technical and financial cooperation of the OCRS (Common Organization of Saharan Regions) to Niger. A cooperation agreement was signed May 12, 1959, making valid in Niger the French Saharan regulations for exploration, exploitation, and transportation of hydrocarbons (Code Petrolier de l'OCRS). END

HYDRIL has the SAFE answers

TO DRILLERS' PRESSURE-CONTROL PROBLEMS!



above-ground

No blowout prevention control program is better than the power available to operate it, and HYDRIL AUTOMATIC PUMP ACCUMULATORS made to match Hydril Blowout Preventers, assure safety in *any* control system by providing a constant, instantly available source of hydraulic power to actuate hydraulically operated blowout prevention equipment. Choice of engine or motor driven units, in a wide range of hydraulic storage capacities.

To take dangerous vibration out of rotary hose, HYDRIL PULSATION DAMPENER absorbs surge at the reciprocating mud pump . . . saves possible injuries to drilling crew . . . saves damage to costly equipment.

All drilling fluids – abrasive or not – are handled with equal ease by HYDRIL TYPE "K" NON-LUBRICATED BALL PLUG VALVES. New patented compressible port seal is the secret of seep-proof shutoff, continued easy operation. Hydril Ball Plug Valves always work on the first try . . . can't stick or freeze . . . require minimum maintenance to stay in perfect working order.

in-the-cellar

HYDRIL BLOWOUT PREVENTERS successfully contain dangerous downhole pressures while permitting various sized members of the drill string to pass in and out of the hole . . . will actually pack off the open hole in complete safety!

Type "GK" for high-pressure wells, "MSP-2000" for low and medium pressures, "GK-6-10000" for highest pressures.

downhole

You're steps ahead with Hydril's two-step thread. HYDRIL CASING JOINTS make up and break out faster because you make up two threads at once. They save running time . . . hold greater pressures because they seal at *three* places.

The same holds true for HYDRIL TUBING JOINTS. Pressure-tight when made up, you can depend on them to stay that way. There's a wide range of Hydril Joints for faster, safer drilling and completion operations.

HYDRIL INSIDE BLOWOUT PREVENTERS . . . Well Guard; Drill Pipe, Tubing and Casing Plugs; Drill Pipe Float Valves and Back-Pressure Valves . . . effectively block downhole pressures inside the pipe while the Hydril Blowout Preventer is effectively sealing off the annulus.

HYDRIL COMPANY

714 WEST OLYMPIC BOULEVARD, LOS ANGELES 15, CALIFORNIA

Factories: Los Angeles, Calif.; Houston, Texas; Rochester, Pa.

Sales Offices: Bakersfield, Los Angeles, Ventura, California; Harvey, New Iberia, Louisiana; Oklahoma City, Tulsa, Oklahoma; Rochester, Pennsylvania; Corpus Christi, Dallas, Houston, Midland, Odessa, Texas; Casper, Wyoming; New York, New York; Calgary, Edmonton, Canada.

SENEGAL

The Mali Federation, composing Senegal and the Sudan, broke up 18 months after it had been formed in August 1960.

EXPLORATION: Principal exploration is by SAP (Ste. Africaine des Pétroles) owned 30% by BP Exploration Co. and 20% by BP's French affiliate, Ste. Francaise des Pétroles BP. The remainder is owned by French (mostly government) entities. SAP made no discoveries in 1960, although some wells were testing (see table).

SENEGAL—Wells Drilled by SAP During 1960

Well Name	Project	Well Spudded	Well Terminated	Total Depth (Meters)	Result
Cr. 1 Cayar 1	Cr.A	1-24-60	2-28-60	2,050.6	Dry
Bb. 1 Banbilor 1	Bb.A	3-15-60	5- 6-60	2,068.4	Gas (non-commercial
DN. 5 Diam Niadé 5	DN.F	5-15-60	7-14-60	2,150.0	Dry
DN. 6 Diam Niadé 6	DN.G	11-10-60	11-25-60	1,250.	Testing
DN. 7 Diam Niadé 7	DN.H		Testing		

OIL LAWS

Complete text of Senegal's oil legislation has been published in a noteworthy collection: *"South and Central Africa—Basic Oil Laws and Concession Contracts."* It is a word-for-word compilation of applicable laws, an interesting and useful collection which includes oil regulation for the other countries of South and Central Africa as well. For information, address the publisher directly: *Petroleum Legislation Ltd., P. O. Box 1591, Grand Central Station, New York 17, N. Y.* END

SOMALI (REPUBLIC OF)

The former British Somaliland and the Mandated Territory of Somalia united during 1960 to become the Republic of Somali.

EXPLORATION: Sinclair Somal Corp. is drilling Corioli No. 1, most recent of a series of six deep tests drilled over the past several years. It had some gas shows, and a very small amount of oil. At the end of 1960, it was setting casing and drilling ahead.

Standard Vacuum Co. completed its aerial survey in 1960, and continued geological field surveys. A gravity-meter survey is under way.

The Italian government's Mineraria Somala obtained an extension to its holdings to include all of northern Somalia, Somalia north of its original permit. The company has stacked its rig, and is no longer drilling. Four wells were drilled, with no discovery.

For a concession map of this area, see *World Petroleum Report 1960,* p. 134.

Frobisher Ltd., a Canadian company, completed surface exploration on its exclusive exploration and exploitation rights granted February 10, 1959. The company is reportedly going to sell its interests, perhaps to an unidentified Germany company.

The coastal area adjacent to the Frobisher concession, including the respective offshore portion, covering approximately 9,400,000 acres, was assigned to Sinclair-Somal Corp., Continental Oil Co., Ohio Oil Co., and Amerada Petroleum Corp. at the end of 1959.

OIL LAWS

Entire text of the Somali oil legislation has been published in a noteworthy collection, *"South and Central Africa—Basic Oil Laws and Concession Contracts."* It is a word-for-word compilation of applicable laws, an interesting and useful collection which includes oil regulation for the other countries of South and Central Africa as well. For information, address the publisher directly: *Petroleum Legislation Ltd., P.O. Box 1591, Grand Central Station, New York 17, N. Y.* END

SOMALI—Imports, 1959

(Thousands of Barrels)

	Gasoline	Kerosine	Lubricating oil	Other	Total
United States	—	—	1	—	1
Italy	—	—	2	—	2
Iran	15	5	2	20	42
Saudi Arabia	34	12	1	68	115
Other	2	2	1	5	10
Total	51	19	7	93	170

Source: "Statistica Del Commercio Con L'Estero," 1959, Mogadiscio, through the U. S. Department of State.

SPANISH SAHARA (Rio de Oro)

Interest in this area has been high for some time. Numerous companies have received exploration rights, including additional permits granted to Gulf Oil Corp. which received permits over Blocks 3, 65, 66, and 97 in August 1960.

Operations by Gulf Oil: Permits were granted to Gulf for Blocks 9, 10, 16, 47, and 51 in the Spanish Sahara in January 1960. A gravity-survey program commenced at the end of April, and seismograph operations began in Block 10 in mid-May. By the end of June, reconnaissance gravity control had been gained over the area and semi-detailed control was being acquired in the northwest corner of Block 10 where gravity, photogeology, and seismic results had suggested structure. Gravity and seismic surveying continued through July and August in and around Block 10. A stratigraphic test was spudded on September 3 to check seismic and gravity anomalies and to furnish information on the subsurface stratigraphy.

Gulf's first test was abandoned at 1,800 ft, where drillers had hit basement rock. The rig was moved from the Block 9 site to a site near Tafalla, on Block 10. The second test also reached basement at a shallow depth. The test was in its Block 10. At the end of 1960, Gulf was drilling its third test in the north of Block 10.

The USA Magellan Petroleum Co. has an application pending for Block 18. The French government's Bureau de Réchèrches de Pétrole and the privately owned Edison group of Italy will put up most of the explorations costs if Magellan is awarded the tract.

Geology: The Spanish Sahara is almost totally unknown, geologically speaking. Recent work, however—mostly surface—established the presence of a small pre-Cambrian inlier located west of the limit of crystalline outcrops which occur south of the areas now subject to permits. A belt of Cambro-Ordovician apparently runs approximately south-north along meridian 12° west (i.e., between Blocks 9 and 10), and probably ties in with a similar belt in the Anti-Atlas Mountains in Morocco. It is likely that some pre-Cambrian lies west of this belt. This inlier of ancient sediments, in effect, may cut the presumed northern Spanish Sahara sedimentary basin in half, and may isolate the western part from highly prospective marine Paleozoic beds, particularly Devonian, in the Tindouf basin. The dry SOMIP Dum Doul 1 wildcat being drilled early in 1960 in Tarfaya, just north of Pan American's Block 6 in Spanish Sahara, is for this reason a very important test.

OIL LAWS

The Spanish Sahara is subject to the Spanish Oil Code. For details on that code, please refer to the Spanish section in this report. It includes a review of special conditions applicable to Africa.

Some consternation was caused in 1960 by the government's insistence that the entire amount of minimum investment be expended, regardless of when the property is surrendered. The oil law requires minimum expenditure of about two gold pesetas per year per hectare of exploration area. The government has insisted that companies agree to spend the entire amount due over a six-year exploration period, or about 12 gold pesetas per hectare. END

SPANISH GUINEA

The only companies known to be exploring are Gulf Oil and a Spanish partner who were awarded acreage there as the first grant under Spain's new 50-50 oil law. Gulf and Cepsa, a private Spanish oil company, made a joint bid for 288,000 acres with an $11.8 million eight-year exploration program. END

GAMBIA

British Petroleum reportedly holds a license and did some surface work during 1960 Gambia is a small British possession beginning at the mouth of the Gambia River, West Africa, and extending about 200 miles inland. Only exploration license is held jointly by BP and the French BRP. Some seismic work has been going on for the last four years. END

ZANZIBAR

No exploration is believed to have taken place during 1960. BP-Shell is the only license holder, and the rig was moved to British Somaliland after the last of four shallow test wells had been drilled on Pemba Island.

There is no production or refining. Consumption of oil is not known. END

Do all bits look alike to you?

Here's Why

"Blue Demon"

Bits Are Better

For Your Budget...

"Blue Demon" Bits . . . the original replaceable blade bits developed to cut cost-per-foot in shot hole drilling . . . continue to pace bit progress as drilling conditions change.

The addition of cuttings deflectors to the face of Hawthorne's patented replaceable blades . . . to substantially reduce plugging between formation layers . . . gives the driller considerable versatility with drilling weights . . . which in turn results in faster hole . . .

Plus the 4-Blade feature developed for faster penetration in harder formations . . . with more cutting surface on bottom to keep the bit from walking . . . providing a straighter hole to load, and less strain on your drill . . .

Plus the highest quality of materials and craftsmanship in every Hawthorne "Blue Demon" product

Plus ample stocks of popular shot hole sizes maintained in every active exploration area . . .

. . . are reasons why more shot hole drillers use "Blue Demons" than all other drag-type bits combined. Try a set on your next hard-rock location.

WRITE FOR ILLUSTRATED CATALOG

HERB J. HAWTHORNE INC.

Cable Address: HAWBIT • P. O. Box 7366 • Houston 8, Texas

U.S. Patent Nos.
2,615,684
2,666,622
2,695,158
2,783,973
2,831,657
2,859,942
3,890,030
2,894,726

298

SOUTH WEST AFRICA

EXPLORATION: Interest heightened somewhat in this mandate administered by the Union of South Africa during 1960, but no drilling was performed. A concession of 90,000 square miles was awarded to Etosha Petroleum Co., wholly owned subsidiary of Texas Eastern Transmission Corp., in 1960. A preliminary geological reconnaissance program is now in progress.

A concession was granted in 1960 to Artnell Exploration Co., wholly owned subsidiary of Artnell Co., Chicago.

In mid-1959, oil and gas rights in Diamond Area 2, a 7-million-square-mile area located along the coast south of Sandwich Bay and north of Luderitz, were transformed to North American interests including Trans-American Mining Corp. Ltd., of Toronto, Canada. Surface-geology, magnetometer, and other geophysical work was done. Drilling, to commence in 1960 or 1961, was being considered.

Conorada Petroleum Corp. did surface geology in the southern part of the inland block, but later withdrew.

OIL LAWS

Ordinance No. 26 of 1954, assented to on June 25, 1954, is part of the basic oil regulations in South West Africa. But the provisions of this law are orientated to hard-rock mining, and some of its provisions are meaningless with respect to oil; and certain other points with respect to oil are left untreated by the law. In view of this, the grant to Etosha was augmented by an agreement between the chief executive of the Territory of South West Africa and the company to spell out the details of the rights and obligations which appertain to the concession grant. Etosha is not at liberty to disclose the terms of this auxiliary agreement. END

SOUTH AFRICA (Union of)

EXPLORATION: No exploration of note has been reported. The director of the Geological Survey in Pretoria stated, on November 7, 1958, that a company called "The South African Natural Oil Exploration Co." had been registered in Pretoria and acquired extensive portions of the Eastern Transvaal, the Orange Free State, and Natal for prospecting; but no work was reported in 1960.

PRODUCTION: There is no production of crude petroleum but oil is obtained from distillation of a torbanite seam about 18 inches thick, forming the bottom portion of a coal seam about 12 miles north of the town of Ermelo in the Eastern Transvaal; also from an inferior thick coal seam occurring about 20 miles north of the town of Vereeniging in the Orange Free State. It is extracted by the Fischer-Tropsch process by a company called The South African Oil and Gas Corp. (SASOL). A great deal of money has been invested in this plant, but results to date have not been spectacular.

REFINING: Work on the site for South Africa's new US $70 million refinery near Durban began November 4, 1960. The refinery will be constructed and operated by South African Petroleum Refineries (Pty.) Ltd., held jointly by The Shell Petroleum Co. Ltd. and British Petroleum Ltd. on a 50-50 participation. It will come onstream at the beginning of 1964. Capacity will be between 60,000 and 80,000 b/d. Products from the refinery will be distributed throughout the Union of South Africa, the surplus fuel-oil production being available for export.

Standard Vacuum's 25,000 b/d refinery at Durban is the only one in South Africa at present.

MARKETING: Consumption of oil products in the Union of South Africa came to 942,214,000 imperial gallons in 1959, against 927,583,000 in 1958. A further gain of 4% is foreseen for 1960.

NATIONAL FACTORS

South Africa voted in 1960 to become a republic, replacing Britain's Queen Elizabeth II with a president as head of State. The vote was a victory for the Nationalist party led by Prime Minister Hendrik Verwoerd. Under the country's apartheid laws, none of the 11 million nonwhites was permitted to vote.

The vote makes it virtually certain that the country will leave the British Commonwealth. London sources feel the move will hurt the Union's ability to attract investment capital. By ending their status as a constitutional monarchy owing allegiance to Britain's Queen, the South Africans automatically lost their membership in the Commonwealth. END

SUDAN

EXPLORATION: Little new activity has taken place in this huge country since the last review in *World Petroleum Report 1960,* p. 143. (See that section for a concession map of ENI holdings.) General Exploration Co., Los Angeles, Calif., also received exploration licenses during 1959, but no report on activities has been received.

The Shell group received permission to make some reconnaissance, but announced late in 1960 that it had abandoned the search for oil in the northwest of the country. 90% of the Sudan is geologically unfavorable, so there may be little room for new concessions left.

Both General Exploration and ENI (through its exploration subsidiary, AGIP) have undertaken surface work. ENI is conducting seismic work as well, according to reports, but no drilling has taken place, nor is any planned for the near future.

REFINING: Shell and British Petroleum are weighing a proposal for a joint $16.8 million refinery in the Sudan. They began a study of the project in 1959 after (as established marketers there) they had been invited by the Sudanese government to submit a counterproposal to a refining bid from Italy's ENI.

OIL LAWS

For a résumé of the country's oil law, see *World Petroleum Report 1960,* p. 143. The ENI grant was reported widely in the press as having government participation in all phases. This is not believed to be true, and an ENI spokesman has asserted the AGIP (ENI's subsidiary) holdings are strictly according to the law, not in 50-50 partnership as reported.

Complete text of the Sudan's oil legislation has been published in a noteworthy collection: "*South and Central Africa—Basic Oil Laws and Concession Contracts.*" It is a word-for-word compilation of applicable laws, an interesting and useful collection which includes oil regulation for the other countries of South and Central Africa as well. For information, address the publisher directly: *Petroleum Legislation Ltd., P. O. Box 1591, Grand Central Station, New York 17, N. Y.* END

TANGANYIKA

BP-Shell Development Co. of Tanganyika is believed to still hold its licenses, but no report of activity has been received. For a license map, see *WPR 1957.* Four wells—Pemba 1, 2, 3, and 4—were drilled in 1959, the last still drilling at the year's end. All were stratigraphic tests, with no results reported.

OIL LAWS

Complete text of the Tanganyika oil legislation has been published in a noteworthy collection: "*South and Central Africa—Basic Oil Laws and Concession Contracts.*" It is a word-for-word compilation of applicable laws, an interesting and useful collection which includes oil regulation for the other countries of South and Central Africa as well. For information, address the publisher directly: *Petroleum Legislation Ltd., P. O. Box 1591, Grand Central Station, New York 17, N. Y.* END

BRITISH TOGOLAND

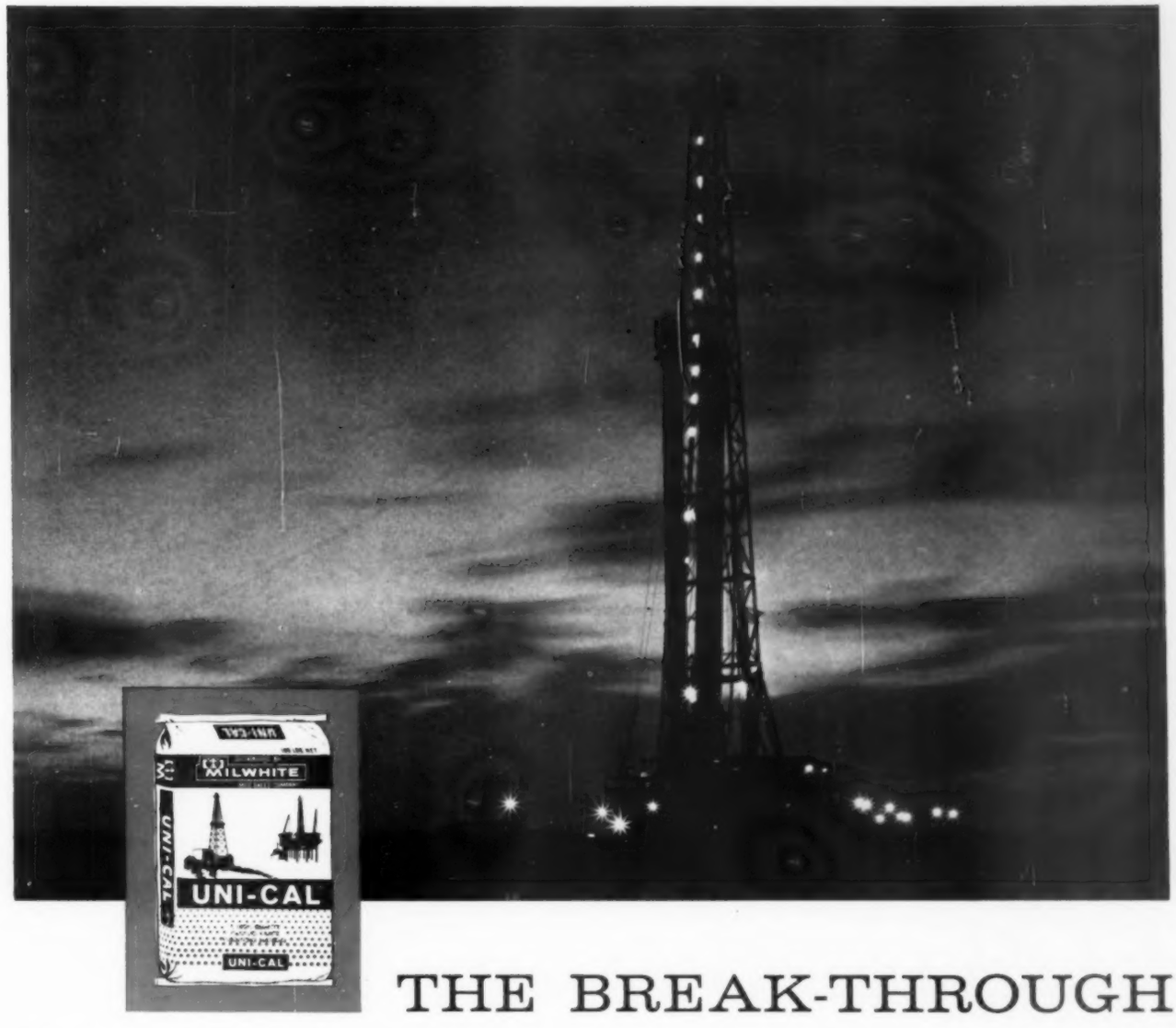
No petroleum activity was reported in British Togoland during 1960. There is no refining and marketing needs are very small.

BECHUANALAND

No exploratory, refining or production operations for oil took place in Bechuanaland during 1960, according to the Deputy Director of the Geological Survey at Lobatsi, Bechuanaland Protectorate. END

SAO TOME & PRINCIPE

No exploration was reported during 1960. No production or refining exists. Consumption needs are very small, all imported. END



THE BREAK-THROUGH TO DECREASED DRILLING COSTS

Uni-Cal is the complete mud system which repays you for your investment in the form of decreased total well drilling and production costs and requires no special environment in order to perform efficiently. Uni-Cal means minimum rotating time to target depth, maximum protection of the well bore, decreased trip time, and minimum conditioning time for the drilling mud system.

The development and perfection of this altogether new approach to drilling mud began more than six years ago. During those years, hundreds of compounds were made and evaluated before Uni-Cal was synthesized in Milwhite's Research Laboratories.

Uni-Cal, Super-Col, Lubri-Film and many other special products are all engineered for Decreased Drilling Costs. *Call, Write or Wire for Further Information . . .*

EXPORT OFFICES:

HOUSTON, Texas, 3920 Essex Lane — Phone MO 7-9331
NEW ORLEANS, Louisiana, 615 Saratoga Bldg., — Phone: JA 5-0733
NEW YORK, New York, International Tool & Supply Company
45 Rockefeller Plaza, Suite 628 — Phone: CI 5-3730 Teletype: NY 1 2819

MILWHITE

MILWHITE MUD SALES COMPANY

General Offices
3920 Essex Lane
Houston, Texas P. O. Box 22111
Phone: MOhawk 7-9331
Cable: MILWMUD Teletype: HO 184

DIVISION OF MISSISSIPPI RIVER FUEL CORPORATION

DAHOMEY

No exploration was reported in 1960. According to the July 1960 edition of the AAPG Bulletin a company known as SOPEDA was created in 1959 in Dahomey by two Canadian groups, Consolidated Denison Mines Ltd. and Transcanada Exploration Limited. SOPEDA applied for an exploration permit in the Cretaceous-Tertiary coastal basin of Dahomey. Three permits in the southern, sedimentary part of Dahomey along the Nigerian frontier, including one offshore permit, were granted by the government on November 12, 1959, according to *Petrole Informations.* END

MAURITANIA

The new concessions were granted April 1, 1960, to PETROPAR and SAP. PETROPAR received the Port-Etienne permit of 38,447 square kilometers, of which 13,852 sq km are offshore. Duration is five years. Minimum investment is two billion CFA francs. Interests were assigned as follows: Continental Oil, 25%; Cities-Service, 24%; and PETROPAR, 51%.

SAP has received a permit known as Nouakchott covering 29,535 sq km, of which 3,730 sq km are offshore. Duration is five years, and minimum expenditure 1.5 billion CFA francs. Interests were assigned as follows: Continental Oil, 24%; Cities Service, 25%; EURAFREP, 25% and SAP, 26%.

No report has been received of petroleum exploration in this area during 1960. There is no production or refining. Consumption needs are very small. END

GUINEA

EXPLORATION: Some reconnaissance field geology has been conducted in the Paleozoic area of Guinea by Société des Petroles due Sénégal (SPS) and Compagnie des Pétroles Total d'Afrique Occidentale (COPETAO). END

BASUTOLAND

No petroleum operations, other than a very small amount of marketing, were conducted in Basutoland during 1960, according to the Public Works Department, P. O. Box 20, Maseru. No applications for petroleum concessions were received and no exploratory operations have been done in previous years. END

NYASALAND

No exploration or production activities took place during 1960. There is no refinery and marketing needs are very small. END

FRENCH SOMALILAND

No petroleum activity was reported during 1960.

There is considerable oil trade in and out of Djibouti. During 1959 a total of 976,496 metric tons were imported. Of this total, 6,557 metric tons were used in local consumption, the remainder exported to Ethiopia, British Somaliland (now part of Somali Republic) and other areas. END

UGANDA

The Acting director of the Geological Survey of Uganda, in Entebbe, Uganda, stated by letter of September 6, 1960, that no exploration for oil took place during 1960.

There is no production or refining. Marketing needs are believed very small, and all imported. END

TOGOLAND

No exploration activities were reported during 1960. There is no production, although much of the country lies in the Niger basin area; and no refining. END

RHODESIA (NORTHERN)

No petroleum exploration took place during 1960, according to the director of the Geological Survey in Ridgeway, Lusaka.

With regard to the establishment of a refinery, Robert S. Steinbock of National Bulk Carriers, Inc., and two representatives of American Independent Oil Co. arrived in Salisbury on October 12 to continue investigations. The Prime Minister, Sir Roy Welensky, has indicated that the companies have to submit their plans to the government before the end of 1960. END

RHODESIA (SOUTHERN)

No exploration took place during 1960, and none is contemplated, according to the director of the Geological Survey Office, Causeway, Salisbury, Suthern Rhodesia. The possibility of finding oil in the country is considered remote. END

UPPER VOLTA

No exploration is reported for 1960. There is no production or refining. END

SIERRA LEONE

No exploratory developments are reported. There is no production or refining. END

SWAZILAND

No exploration took place during 1960, and none has ever been done due to the unfavorable geology. There is no production or refining. Consumption needs are unknown, but very small. END

Are you selling to the oil industry?

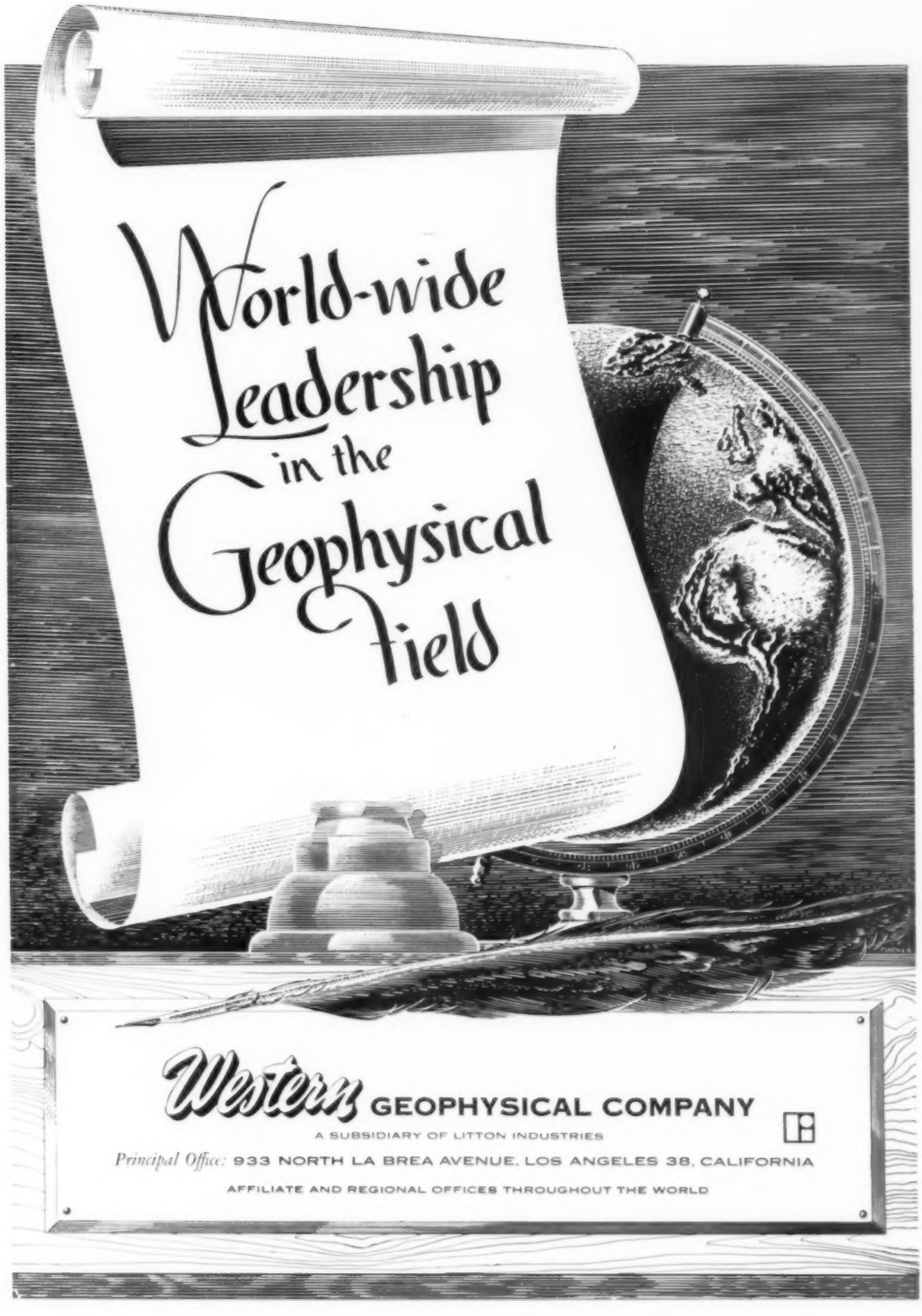
Here is the international oil industry's oldest and most complete directory:—

THE INTERNATIONAL PETROLEUM REGISTER

- It has been completely redesigned to place at your fingertips the most up-to-date information on every oil producing company, wherever in the world it operates.
- Every one of your district sales offices and your distributors should have a working copy of the 36th Edition of the International Petroleum Register. The price is only $25.00 for this 500-odd-page book of over 30,000 names.
- Send in your order today, take a look and we know you'll be more than satisfied.

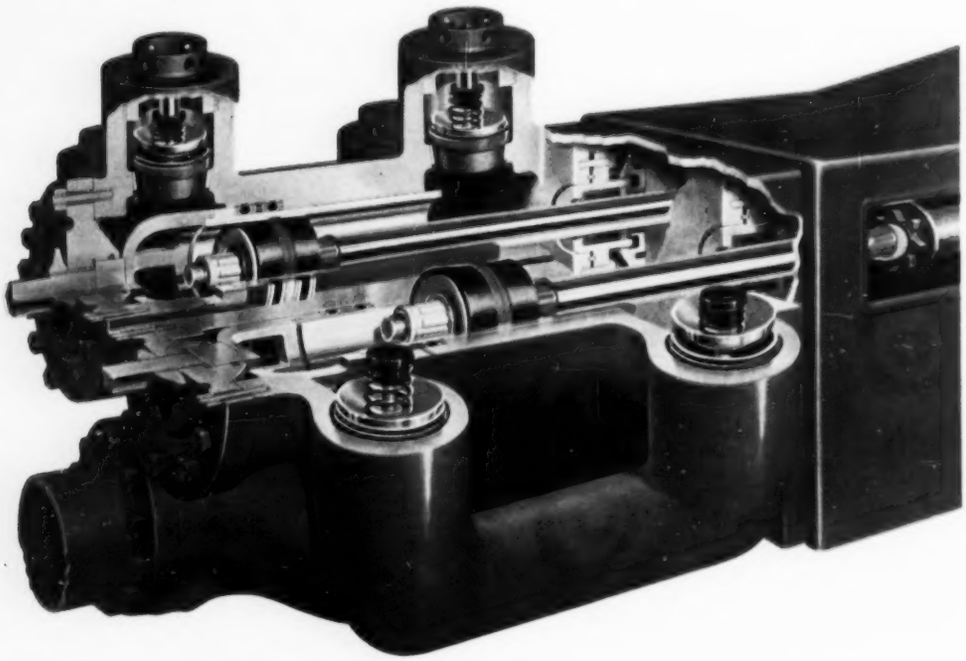
INTERNATIONAL PETROLEUM REGISTER

25 West 45th Street **New York 36, N. Y., U.S.A.**


World-wide
Leadership
in the
Geophysical
Field
Western GEOPHYSICAL COMPANY
A SUBSIDIARY OF LITTON INDUSTRIES
Principal Office: 933 NORTH LA BREA AVENUE, LOS ANGELES 38, CALIFORNIA
AFFILIATE AND REGIONAL OFFICES THROUGHOUT THE WORLD

The "Inside Story" of the Heart of Your Rig

. . . by MISSION



This cutaway view of a mud pump shows where the vital Mission fluid-end parts fit and why they are essential to correct operation. Forces on these parts are staggering. For example, pistons and rods may be subjected to forces of more than 100,000 pounds.

Liner packing and gland packing may be exposed to pressures exceeding 2000 psi, and valves and seats are required to stand violent impact every time they close.

Liners, also, are subject to "rocking," which aggravates both piston and liner packing wear unless all critical liner dimensions are held within API specifications.

These forces may be multiplied by shock loading at times, and they are completely reversed at least once every second. When you remember that mud may contain abrasive sand to cut metal parts, corrosive chemicals to pit them, and oil to attack rubber, it seems obvious that only the best pump parts stand a chance.

These Mission Pump Parts are in direct working contact with the drilling fluid, so it is easy to see that they are vital to correct pump operation. When you remember that they work together for trouble-free service, it makes sense to specify *all* Mission Pump Parts—exclusively—in all your pumps. Your pumps will perform better, require fewer repairs and cost less to maintain when you do. The famous Mission Guarantee assures you of this service.

For over thirty years—quality built in to last MISSION MANUFACTURING CO.

MISSION MANUFACTURING CO. P. O. BOX 4209, HOUSTON, TEXAS • CABLE ADDRESS "MISSCO" • EXPORT OFFICE: 30 ROCKEFELLER PLAZA, NEW YORK
IN THE UNITED KINGDOM: **MISSION MANUFACTURING CO., LTD.**, 1 HANOVER SQUARE, LONDON W. 1 ENGLAND • CABLE ADDRESS "MISSOMAN"

MIDDLE EAST

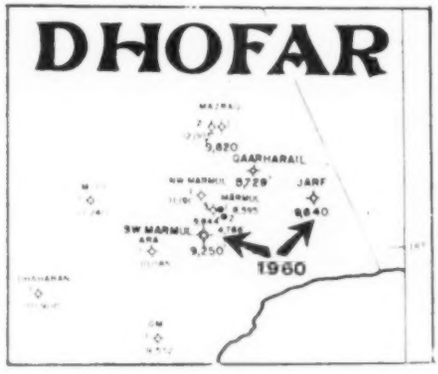
AFGHANISTAN

EXPLORATION & PRODUCTION: Russian crews have been drilling under terms of an agreement dated 7 January 1958 between the Afghan Ministry of Mines and Industries in northern Afghanistan. During June 1960 Russian sources announced a discovery of oil and gas near Aq Shah, north of the great Hindu Kush mountains. A previous test at Sar-i-Pul about 75 miles southwestward, had reported oil and gas shows.

MUSCAT AND OMAN

Two companies are working in this country, an IPC affiliate and Dhofar—Cities Service Petroleum Corp. For IPC activities see the Trucial Coast section.

In Dhofar, the southernmost part of Muscat and Oman, intensive drilling by Dhofar-Cities Service has slowed down and intensive seismic work is being done. The company has drilled a number of dry wells (see map) but during 1960 only drilled two: Jarf, abandoned at 9,647 feet (the map is slightly inaccurate on this depth), and Southwest Marmul, abandoned in May 1960 at 9,250 ft. Five stratigraphic tests were drilled during 1960, and the company had one strat rig drilling during early 1961.



BAHRAIN

Little information is available on operations in this stable island kingdom. There was one exploratory well begun during 1960; only one rig was active, and one well was reported drilled to producing formations. As of June 30, 1960, there were 150 oil wells, producing an average of 45,063 b/d in the period. For a description of the lone producing field, please refer to *World Petroleum Report 1960*, p. 72. Production is from the Jurassic-Cretaceous, and crude is of about 33 deg. API.

REFINING, MARKETING, TRANSPORTATION: There is one refinery, with 210,000 b/d capacity, owned by the concessionnaire company, Bahrain Petroleum Co. (BAPCO) which is owned in turn by Caltex, an affiliate of Standard Oil Co. of California and Texaco Inc. No information on runs is available, nor on source of crude processed. Much of it, however, comes from Saudi Arabia via twin 12-in. pipelines under the Persian Gulf.

ADEN

Aden is composed of Aden Colony—with a population of about 140,000 and an area of 75 square miles—and Aden Protectorate, comprising a number of sultanates and tribes bound by treaty relations with the British. See World Petroleum Report 1957, page 28 for a description of the political structure, brief statement of the oil law and petroleum history.

EXPLORATION: No exploration was performed in Aden Protectorate during 1960, and Petroleum Concessions Ltd., affiliate of Iraq Petroleum Co., announced it had abandoned exploration there. Socony Mobil Oil Co. and Standard Oil Co. (New Jersey) had announced earlier their decision to abandon their participation in Petroleum Concessions Ltd.

The sheikdoms of Kathiri and Quaiti announced their agreement on 9 September 1959 that revenue from oil (if any) would be split one-third/two-thirds respectively between them. Following the surrender by Petroleum Concessions Ltd. of its 20-year old licenses, the Sultanates invited applications on their area, some 5,000 square miles, about 180 miles inland. No concession applications have been reported, however.

There is no oil production in Aden at present.

REFINING AND MARKETING: The large 100,000 b/d refinery at Aden Colony is owned by British Petroleum Co. and continued operations in 1960, despite a short strike in February. Refinery runs during the first six months of 1960 were as follows: (in thousands of long tons)

Gasoline (motor and other)	162,900
Kerosine	120,400
Gas/Diesel oils	261,400
Fuel oils	704,700
Other products	21,200
	1,270,600

OIL LAWS

For a statement of Aden's extremely brief oil regulation see WPR 1957. END

ABU DHABI

Only one company is operating in Abu Dhabi's offshore acreage (for a review of onshore operations see the Trucial Coast section). Abu Dhabi Marine Areas Ltd., owned two-thirds by British Petroleum Co. and one-third by Cie. Francaise des Petroles, has been developing its discovery at Umm Shaif (formerly Adma), made in September 1958. Four wells have been drilled, all producers at the end of 1960, and the company has one rig actively drilling a fifth. For well coordinates see WPR 1960, where the first well is also described. Umm Shaif 2, located 10,000 feet west of the discovery, was reported completed as a successful extension well at total depth of 7,815 feet. A third test, located about 1½-miles east of the first, was also a success.

An 18-in. pipeline is planned for the Umm Shaif offshore field. The pipe 20-mi. line will run to Das Island, where a tanker-loading jetty will be built.

TRUCIAL COAST

Some exploration is being done onshore and offshore in this area. For a review of the offshore work, see the section on Abu Dhabi in this review. Muscat and Oman (Dhofar region) also is reviewed separately.

Onshore, an affiliate of Iraq Petroleum Co. cut down its activities somewhat with surrender of the Ras al-Khaima concession area. The company's Fujaira exploration rights expired in late 1959, and exploration rights over the mainland of Sharjah sheikdom were likewise surrendered.

The ownership of Petroleum Development (Trucial Coast) Ltd. was changed when the American companies comprising it dropped out. It is now entirely owned by Shell and the Gulbenkian interests. They have continued work at Murban 3, where "several interesting shows" were reported below 8,400 ft, according to the company. Murban 4 was spudded in during 1960, as well as Murban 5. No information on the status of these wells is available.

In February 1960, an exploration well at Haima was abandoned after having reached 11,504 ft. In the same month, Afar 1 was spudded in; but this well, the fourth to be drilled by the company, was abandoned at 4,749 ft in April 1960. END

JORDAN

EXPLORATION: After six dry wells, Phillips Petroleum Co. formally announced, in December 1960, it is pulling out of exploration in Jordan. Phillips acquired its first stake in Jordan under an agreement with Pauley Petroleum in 1957, subsequently acquiring that company's rights over about one-third of the country.

ISRAEL

EXPLORATION*

Total footage drilled in Israel during the first 10 months of 1960 (102,256 ft.) shows a 32% increase over that drilled the previous year. As of November 1st, five wells were drilling, which were expected to be completed by the end of the year. It is estimated that a further 8,000 ft. will be drilled in November and December which will raise the footage increase to 41% above the 1959 period. (Tables I-VI). The upward trend as noted for 1960 in comparison to 1959, can be found in all phases of drilling activity.

The highlights of petroleum exploration during the first 10 months of 1960 were: a) the extension of the Zohar gas field 3 miles to the north; and b) the discovery of oil in Negba 3, 2½ miles to the north of the Heletz-Brur oil field.

Zohar-Kidod Gas Field: To date a total of seven wells have been drilled in the Zohar gas field. The proven limits of the field were extended three miles to the north with the successful completion of Kidod 1 and one mile to the south with the drilling of Zohar 5. The final limits of the field are still unknown. The three recently completed wells (Table V) are being tested and no estimates are available yet as to their productive capacity.

Gas is being produced from Jurassic limestone from a depth of approximately 3600 ft. Three zones were found to be productive in the earlier drilled wells. It is significant that in Zohar 6 and Kidod 1 additional gas bearing zones were found at deeper levels than those already known. Production tests are being carried out as well on these lower zones. Oil impregnated sandstone below the gas zone as first discovered in Zohar 1, were also found in Zohar 6. All attempts to produce this oil, however, have failed.

The Zohar gas is still not being exploited, though plans are underway for the laying of a six-inch pipe line to the Dead Sea Works, a distance of 16 miles. Based on tentative reserve estimates and results of available production tests, it is believed that a production of 9-10 million cubic feet daily can be sustained for a period of 10-15 years. Additional wells are planned in the coming year to delineate the northern and eastern limits of the field.

Negba Oil Field: On September 1st, 1960 oil was discovered in Negba 3, two and one-half miles north of the Heletz-Brur oil field. Two earlier wells drilled on the structure, one-half mile to the SE and one-half mile to the SW of the Negba 3, were dry and the area was generally considered to be non-productive. Of special importance is the fact that in Negba 3 oil was found in horizons other than those from which the Heletz-Brur wells produce. This has brought up for re-appraisal the oil prospects of the entire Coastal Plain where up-dip pinch-outs of Lower Cretaceous sands may occur.

60-70 bbls/day are now being produced from Negba 3. The extent of the field is unknown and Negba 4 is currently drilling approximately one-fourth mile to the north-west of Negba 3.

Heletz-Brur Oil Field: During 1960, the northern limits of the Heletz-Brur oil field were extended with the successful completions of H25 and H26. To date, 33 wells have been drilled in the field of which 24 wells are at present producing. One well on the east flank has been shut in due to excessive water production. A total cumulative production of 2,840,000 bbls was reached by Nov. 1st, 1960, 700,000 bbls having been produced during the first 10 months of 1960. Tentative reserve estimates indicate an ultimate recovery by primary methods of approximately 15,000,000 bbls. The present daily production from the field amounts to 2600 bbls/day. All wells are now on the pump with the average bottom hole pressures reaching 1539 psi.

The search for shallow Neogene gas deposits was continued in the Coastal Plain with the drilling of four wells. Though no gas was found, the results of the National Park drilling are considered to be encouraging. Drilled in an area where the subsurface stratigraphy was generally believed known, a Neogene sequence was found in this well which was different in lithology to all other drillings in the vicinity. The presence of conglomerates and vesicular basalts provide new potential gas reservoir targets.

Three stratigraphic wells were drilled to the west of the Heletz-Brur anticline in search for potential truncated reservoirs beneath the Neogene marl onlap. These met with no success.

Seismic investigations during 1960 were concentrated entirely in the Southern Coastal Plain. Approximately seven field months of reflection work were carried out in the Nirim, Negba and Gilat areas. Experimental shooting using magnetic tape recording and playback instruments were successful in obtaining continuous reflections in hitherto classified "poor" to "no reflection" areas. It is expected that in the forthcoming year, there will be an increase in seismic activity based on these improved techniques.

A gravity survey was completed in the early part of 1960 covering approximately 250 sq. miles of the northern Negev region east of Beersheba. A number of sub-surface structures were indicated by gravity in the Kuseife-Dimona area which may prove promising in light of the nearby Zohar-Kidod gas discoveries. Since the beginning of petroleum exploration, almost 3000 sq. miles have been covered by gravity surveys.

As of November 1st, 1960, six companies were actively engaged in petroleum exploration in Israel. During the early part of the year L.I.O.P. acquired a controlling interest in the holdings of I.N.P.C. The year was furthermore marked by a number of farm-out agreements between the companies. These included: (a)

* Review by Dr. P. Grader, Petroleum Commissioner.

TABLE I. ISRAEL—WILCAT DRILLING IN ISRAEL, 1960

Company	Well	Licence	Date Spudded	Date Completed	Total Depth (ft.)*	Bottomed In	Remarks
I.N.O.C.	Arava 1	IV/7	14.6.59	11.5.60	8,980	Neogene	Abandoned due to technical difficulties
I.C.O.C. / I.A.O.C. / I.N.O.C.	Beersheba 1	II/25	1.1.60	17.8.60	9,180	Triassic(?)	Testing
L.I.O.P.	Nirim 1	II/22	26.5.60	11.8.60	7,770	Jurassic	Dry, with minor gas shows
L.I.O.P.	Negba 3	II/8	29.7.60	1.9.60	5,523	Lower Cretaceous	Oil production from Lower Cretaceous sands
L.I.O.P.	Nirim 2	II/22	26.8.60	———	6,100	———	Drilling
N.I.P.C. / I.N.P.C. / I.N.O.C.	Daya 1	I/15	2.9.60	———	4,900	———	Drilling
L.I.O.P.	Qern 1	I/26	6.9.60	———	4,900	———	Drilling
			TOTAL		47,353		

*All depths are with reference to Kelly bushing.

TABLE II. ISRAEL—STRATIGRAPHIC HOLES DRILLED IN 1960

Company	Well	Licence	Date Spudded	Date Completed	Total Depth (ft.)	Bottomed In
I.N.O.C.	Jaffo 1	II/21	10.1.60	26.2.60	7,677	Upper Cenomanian
L.I.O.P.	Talmei Yaffe 1	II/8	31.1.60	16.2.60	3,240	Lower Cretaceous
L.I.O.P.	Talmei Yaffe 2	II/8	25.2.60	24.3.60	5,016	Lower Cretaceous
I.A.O.C.	National Park 1	II/27	22.3.60	10.4.60	3,871	Upper Cenomanian
L.I.O.P.	Talmei Yaffe 3	II/8	4.4.60	30.4.60	5,504	Lower Cretaceous
L.I.O.P. / N.I.P.C.	Mavkiim 2	II/16	14.6.60	30.6.60	3,423	Neogene
I.A.O.C. / I.N.O.C.	Kfar Azar 1	II/27	27.7.60	2.8.60	2,720	Upper Cenomanian
Total footage drilled as of Nov. 1st/1960					31,451	

TABLE III. ISRAEL—DEVELOPMENT WELLS DRILLED IN HELETZ-BRUR OIL FIELD, 1960

(Lapidot, Israel Oil Prospectors Corp. Ltd.)

Well No.	Date Spudded	Date Completed	Total Depth (ft.)	Remarks
Heletz 25	25.12.59	17.2.60	2,365	Abandoned due to technical difficulties
Heletz 25A	29. 2.60	3.4.60	5,268	Producing from Lower Cretaceous sands
Heletz 26	18. 4.60	5.6.60	5,271	Producing from Lower Cretaceous sands
		TOTAL	12,904	
As of Jan. 1st/1960 Heletz 25 had drilled			1,155	
Total footage drilled in Heletz-Brur oil field development as of Nov. 1st/1960			11,749	

TABLE IV. ISRAEL—DEVELOPMENT WELLS DRILLED IN THE NEGBA OIL FIELD, 1960

(Lapidot, Israel Oil Prospectors Corp. Ltd.)

Well No.	Date Spudded	Date Completed	Total Depth	Remarks
Negba 3	Oil discovered Sept. 1st (see wildcat drilling)			Producing from Lower Cretaceous sands
Negba 4	2.10.60	———	4,300	Drilling
Total footage drilled in Negba oil field development as of Nov. 1st/1960			4,300	

TABLE V. ISRAEL—DEVELOPMENT WELLS DRILLED IN ZOHAR-KIDOD GAS FIELD, 1960
(Naphtha, Israel Petroleum Corp. Ltd.)

Well No.	Date Spudded	Date Completed	Total Depth (ft.)	Remarks
Zohar 5	19. 3.60	28.6.60	5,524	Testing
Zohar 6	1.12.59	12.6.60	5,457	Testing
Kidod 1	10. 4.60	14.7.60	4,613	Testing
Kidod 2	24. 9.60	—	2,900	Drilling
		TOTAL	18,494	
As of Jan. 1st/1960 Zohar 6 had drilled			2,397	
Total footage drilled in Zohar-Kidod gas field development as of Nov. 1st/1960			16,097	

TABLE VI. ISRAEL—SUMMARY OF DRILLING ACTIVITY IN ISRAEL, 1960

	No. of Wells completed	No. of Wells drilling as 1.11.60	Total Footage
Wildcat wells	4	3	38,659
Stratigraphic holes	7	—	31,451
Heletz-Brur oil field development wells	3	—	11,749
Negba oil field development wells	—	1	4,300
Zohar-Kidod gas field development wells	3	1	16,097
Total footage drilled as of Nov. 1st/1960			102,256

I.N.O.C. and I.A.O.C.'s agreement to carry out a joint exploration programme on their Coastal Plain Licences Yarkon II/21, Gezer II/20, Ramle II/27, Yvane II/13; (b) I.A.O.C.'s and I.N.O.C.'s acquisition of a 1/3 undivided interest each in the Beersheba Licence II/25 (I.C.O.C.) for the joint drilling of the Beersheba No. 1 wildcat; (c) N.I.P.C., I.N.P.C. and I.N.O.C.'s joint drilling of Daya No. 1 on the Arad Licence I/15 (N.I.P.C.).

The main trends of exploration during 1961 will probably be: 1) Continued development drilling in the Zohar-Kidod gas field and Negba oil field to define their limits; 2) Drilling of a number of the smaller structures in the northern Negev (Shereif, Boqer) mainly in the search for gas (one such structure is now being drilled —Daya); 3) The search for stratigraphic-structural traps in the Coastal Plain in formations of Lower Cretaceous and Jurassic age. END

Data for this statistical review were obtained from oil company quarterly reports, completion reports and weekly drilling progress reports. Abbreviations appearing in the text are as follows:
I.A.O.C.—Israel American Oil Co.
I.C.O.C.—Israel Continental Oil Co.
I.N.O.C.—Israel National Oil Co.
I.N.P.C.—Israel Negev Petroleum Corp.
L.I.O.P.—Lapidot, Israel Oil Prospectors Corp. Ltd.
N.I.P.C.—Naphtha Israel Petroleum Corp. Ltd.

IRAN

EXPLORATION: Probably the most active oil area in the Middle East, Iran's exploratory drilling during 1960 was more extensive and on a broader scale than for many years past, with new field wildcats in three areas: Gorgan, Bandarabas, and the Zagros Mountains, far removed from those presently producing or previously tested. A number of other exploratory holes were continued or commenced during the year, and important outpost or new-pool tests were drilled in the southern fields area and in central Iran.

NIOC's Gorgan wells are testing a Tertiary section which is productive 50 kilometers to the north in the USSR. Sirip's Sequtah-1 and IOEPC's Suru-1 are probing structures in highly folded mountain areas of western and southeastern Iran.

Drilling:[1] During 1960 prospecting continued in various parts of the country, yielding satisfactory results. NIOC concentrated its activities mainly in the areas of the central Iranian desert and the northern town of Gorgan. By November 26, 1960, Alborz No. 8 well was being tested by NIOC at 11,531 ft with the last casing placed at 10,697 ft. The Alborz field is situated in the Qum area, some 140 km south of Teheran, and was the scene of the famous blowout of No. 5 well which produced some 80,000 b/d of oil for 82 days before it was brought under control.

Exploratory drilling by NIOC also comprised wells No. 3 and 4 at Sarajeh,[2] reaching a depth of 12,180 ft and 10,700 ft, respectively, by November 26, 1960, and pointing to the existence of an extensive oil reservoir in that field. The Gorgan[3] well No. 5 was also drilled to a depth of 4,620 ft as of November 26, 1960, with the last casing placed at 1,075 ft. This well is situated about 40 km from the northeastern town of Gorgan which is itself about 400 km from Teheran. Development drilling was also undertaken in the Naft-i-Shah[4] oil field to boost its production.

Geological and geophysical parties of the Iranian Oil Exploration and Producing Co. (the consortium) have also been active in parts of this company's areas. Exploratory drilling has been as follows: (a) Binak well No. 1, which was abandoned after reaching a depth of 3,299 meters. (b) Maund well No. 2, which stratigraphically is the deepest ever in Iran; drilling at a depth of 2,692 meters continued (as of December 15, 1960). (c) Bandar Abbas No. 1 well; drilling at a depth of 2,991 meters continued (as of December 15, 1960). (d) Paznun well No. 5 was abandoned due to mechanical difficulties after reaching a depth of 2,364 meters. Another well, Paznun, No. 5A, has been drilled.

The consortium's first wildcat outside the mainland will be drilled on Shuaib Island as part of its exploratory program along the coast south and east of its producing fields. Shuaib is the largest of a cluster of islands west of Quishm. It lies roughly midway between the No. 2 Mand wildcat and No. 1 Suru, near Bandar Abbas at the eastern end of the consortium's operating area. Both tests have reached depths of around 12,000 ft. Shuaib will be drilled with the rig from No. 1 Suru.

Drilling of development wells in the Agha Jari and Gach Saran areas by the Iranian Oil Exploration and Producing Co. continued during 1960. The Agha Jari well No. 59 struck oil with a confirmed daily production rate of 30,000 bbl of crude. The Gach Saran wells No. 25 and 26 also reached oil, and wells No. 28, 29, and 30 are being brought on production. Other development drilling operations were progressing according to program at the end of 1960, such as the Naft-Safid well No. 11 and No. W10; Masjid-i-Sulaiman wells No. 127, B167, B239; and Suru well No. 1.

Sirip's offshore well No. 1 is also being tested at a depth of 11,011 ft (and reportedly a 16,000 b/d producer from the Asmari) with the last casing placed at 9,660 ft as at November 26, 1960. Its offshore well No. 2 has been drilled to a depth of 5,217 ft. At Sequta, in the Zagros region, Sirip is engaged in drilling operations carried out at a depth of 6,516 ft, with the last casing set at 4,238 ft, as at November 26, 1960.

The Iran-Pan American Co.'s AI well in the Persian Gulf offshore area is being tested, while its B1 well in the same area has reached a depth of 12,259 ft, with the last casing placed at 4,005 ft as at November 26, 1960. Pan American (IPAC) geophysical work included a seismograph survey done July 1, 1958, through November 1, 1959, and a gravity survey from May 10, 1959 through October 1, 1959.

Exploratory drilling by IPAC includes: IPAC A No. 1—Latitude 29°17′34.10″N, longitude:

IRAN—Discovery Wells Completed in 1960

Operator	Well	Basis for Location	Completed	Total Depth	Potential	Gravity	Prod. Form	Expl. Class
IOEPC	BINAK 1	Surface Geol. & Geophysics	oil	10822			CRET.* Oligo-Miocene (Asmari)	NEW
	AHWAZ		oil			31-31.9		NEW
IPAC	OFFSHORE 1A	Geophysics	testing	13151	—		CRET.	NEW
AGIP	OFFSHORE L	Geophysics	shut in.	11014	—		Asmari	NEW
NIOC	ALBORZ 8	Subsurface Geophysics	testing	11525	—		CRET. Oligo-Miocene (Qum)	Outpost
NIOC	SARAJEH 3	Geophysics	testing	12180	—	gas	Oligo-Miocene (Qum)	Outpost
	SARAJEH 4	Subsurface Geophysics	testing	10700	—	gas	Oligo-Miocene (Qum)	Outpost
	GORGAN 3	Geophysics	July 30	6852	Blewout—Caught Fire	gas	Miocene	NEW

* One of the most interesting developments during the year was the discovery of oil in the Cretaceous in so many widely separated localities and its consequent establishment as an important source of future production in Iran.

IRAN—Geological and Geophysical Activity During 1960
(Crew-Months)

Geology	80
Seismograph	30
Gravity	19
Magnetics	—

IRAN—Well-Completion Summary for 1960

	Oil	Gas	Dry	Obs.	Total
Exploratory tests	5	3	3	1	12
Development wells	5	—	—	1	6
Totals	10	3	3	2	18

IRAN—Exploratory Wells Drilled in 1960

	New Field Wildcats	Outposts	New-Pool Tests
Ahwaz	1		
Gorgan	4		
Bandar Abas	1		
Persian Gulf	4		
Zagros Mts.	1		
Binak	1		
Kuhe Mand	1		
Alborz		1	
Sarajeh		4	
Agha Jar		1	
Paznun			1

[1] Summary by Dr. C. R. Nikpay, National Iranian Oil Co. (NIOC).
[2] South of Teheran, near Qum.
[3] Northeast of Teheran, near the Caspian Sea.
[4] West of Iran, near Iraqi border.

49°31′30.073″E. Spudded October 12, 1959. Reached total depth of 13,151 ft May 5, 1960. IPAC B No. 1—Latitude: 28°28′09.6″N, longitude: 50°28′09.6″E. Spudded May 6, 1960.

Sapphire Petroleums Ltd., a Canadian company, lost the oil rights it had been granted under a joint venture with National Iranian Oil Co. in 1958. Its $350,000 cash deposit was forfeited due to failure to meet an extended deadline to start exploration. Ircan, a joint company set up with NIOC, is to be liquidated in four months.

PRODUCTION: Crude oil produced in the "agreement area" amounted to 279,087,085 bbl during the first nine months of 1960, an increase of 10.3% as compared with the same period of 1959. Crude oil produced in Naft-i-Shah by NIOC amounted to 1,600,247 bbl during the period under review, thus representing an advance of 12.9% compared with the same period of 1959. On July 29, 1960 the four-billionth barrel of crude oil was produced from Iranian wells.

Gas production in the "agreement area" totaled 190,478 million cubic feet during the nine months' period. About 13% of this gas was utilized; 25% was used in turbines and then flared; and the remaining 62% was flared.

The total gas production of Naft-i-Shah during the nine months' period under review amounted to 1,158 million cubic feet, of which 60% was utilized and 40% flared.

Reserves: Total reserves of crude oil, proved and recoverable, are estimated at 40 billion barrels as of January 1, 1961. This includes the government's estimate for its Sarajeh structure, about 100 miles south of Teheran where NIOC discovered oil and gas.

IRAN—Internal Consumption

	1957		1958		1959	
	Cubic Meters	% Increase	Cubic Meters	% Increase	Cubic Meters	% Increase
Fuel oil	759,482	0.4	874,204	15.1	1,026,853	17.4
Kerosine	712,938	19.2	751,886	5.4	886,174	17.8
Gasoline	463,515	9.5	523,997	13.0	574,692	9.7
Gas Oil	384,800	29.1	519,708	35.0	707,037	36.0
All others	164,045	12.4	136,103	—17.0	170,877	25.5

TRANSPORTATION: To extend oil distribution pipelines, additional pumping stations are being installed along the Trans-Iranian pipeline, raising its capacity. New filling stations have been built by NIOC in various parts of the country.

The Gach Saran project, aiming at raising the level of production of that field and creating a port on Kharg Island capable of handling tankers of 100,000 tons deadweight, was completed and inaugurated on November 8, 1960. The island is connected to Gach-Saran by a 100-mile 26-in., 28-in., 30-in. pipeline, and crude oil has already started flowing through it for tanker loading. The capacity rate of flow is 230,000 b/d under gravity feed. The island's storage capacity is 2,278,000 bbl, distributed among 12 tanks. The pipeline itself holds about 400,000 bbl.

REFINING: Abadan refinery's output totaled 88,510,116 bbl of various products during the first nine months of 1960, a gain of 13.3% over the same period of 1959. Of the refinery's output and reserves, some 74,872,801 bbl were delivered to the trading companies for export and 12,408,558 bbl to NIOC for internal distribution. The Kermanshah refinery turned out 588,477 bbl of products which, together with the 200,874 bbl of fuel oil from Naft-i-Shah, was placed at the disposal of the NIOC's distribution department.

OIL LAWS

Petroleum operations in Iran are governed by the provisions of the 1957 Petroleum Law, summarized in previous issues of *World Petroleum Report*.

For a detailed and highly recommended study of petroleum-industry legislation and regulation within Iran, the editor highly recommends *Petroleum Legislation*. This is a legislative reference service containing a summary and analysis of the oil laws and other industry regulation for every major country of the world. The national sections are prepared by legal counsel recommended by oil companies who have actually operated within the country concerned. The same oil-law firms keep their reviews up-to-date by loose-leaf revision service. For information on this excellent service, the publisher may be contacted directly at: *Petroleum Legislation Ltd., P.O. Box 1591, Grand Central Station, New York 17, N. Y.*

TURKEY

EXPLORATION: A discovery was made by the Turkish affiliate of Mobil International Oil Co., at Bulgardag, during the latter half of 1960; but some of the bloom went off it at the end of the year. A stepout, Bulgardag 3, was abandoned on December 8 at a total depth of 5,738 ft in Paleozoic dolomite. Bulgardag 4 was also dry. A fifth test was drilling below 4,000 ft on January 19, 1961.

Another discovery was made in 1960 by Shell in southeastern Turkey, about 30 miles northeast of the city of Diyarbakir. The well produced 22 bbl of 38-gravity crude on a 108-min test from a depth of 5,798 ft. Also by Shell, a noncommercial oil find was made in European Turkey by a joint German and Royal Dutch/Shell effort. Kuleli 1, drilled 22 miles east of Edirne, in the northern part of Thrace, encountered gas and oil in Tertiary at 8,850 ft. The well had an intermittent flow of gas, oil, and water on production tests. The find is on concessions which had been pooled by Deilmann Petrol Ltd. and NV Türkse Shell after negative results in separate programs. The well was later abandoned, and a stepout was dry.

The lack of commercial oil finds by mid-1960 had caused two companies, Bolsa Chica and Esso, to withdraw from the country. Bolsa Chica had drilled four dry holes at Sylvan 1. Esso withdrew after expenditure of almost $20 million and a long series of abandoned wells.

PRODUCTION: The only production in the country at present is from the Raman fields, operated by TPAO, the government's oil company. Production during 1960 averaged 7,016 b/d (production figures were supplied by TPAO).

TRANSPORTATION: There are no crude lines of importance in Turkey. Some work is being done on NATO product lines, but is for military distribution only.

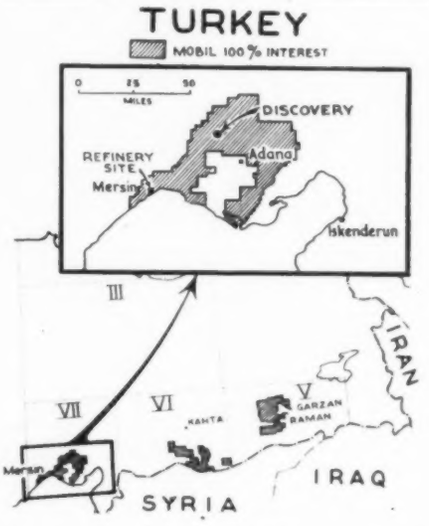
REFINING: There is only one refinery in the country at present. It is a small 6,900 b/d plant at Batman, near the Raman fields. It has about 3,000 b/d catalytic cracking capacity.

A 65,000 b/d oil refinery is under construction at Mersin in southeastern Turkey. The project is being financed by Mobil International, Royal Dutch/Shell, and British Petroleum, whose shares in it will be 56%, 27% and 17%, respectively. The refinery is expected to go onstream during the latter half of 1961.

Agreement was reached in 1960 between the State-owned Turkish Petroleum Corp. and Caltex on the construction of a jointly owned 20,000 b/d refinery near Izmit, in the Istanbul area, to be completed in 1962. Caltex will have a 49% interest, and will operate the refinery for 10 years after which Turkish Petroleum has the right to buy out Caltex's interest. Istanbul Petrol Rafinerisi AS (IPRAS) is name of the new company which will own and operate the refinery.

OIL LAWS

For a detailed and highly recommended study of petroleum-industry legislation and regulation



within Turkey, the editor highly recommends *Petroleum Legislation*. This is a legislative reference service containing a summary and analysis of the oil laws and other industry regulation for every major country in the world. The national sections are prepared by legal counsel recommended by oil companies who have actually operated within the country concerned. The same oil-law firms keep their reviews up-to-date by loose-leaf revision service. For information on this excellent service, the publisher may be contacted directly at: *Petroleum Legislation Ltd., P. O. Box 1591, Grand Central Station, New York 17, N. Y.*

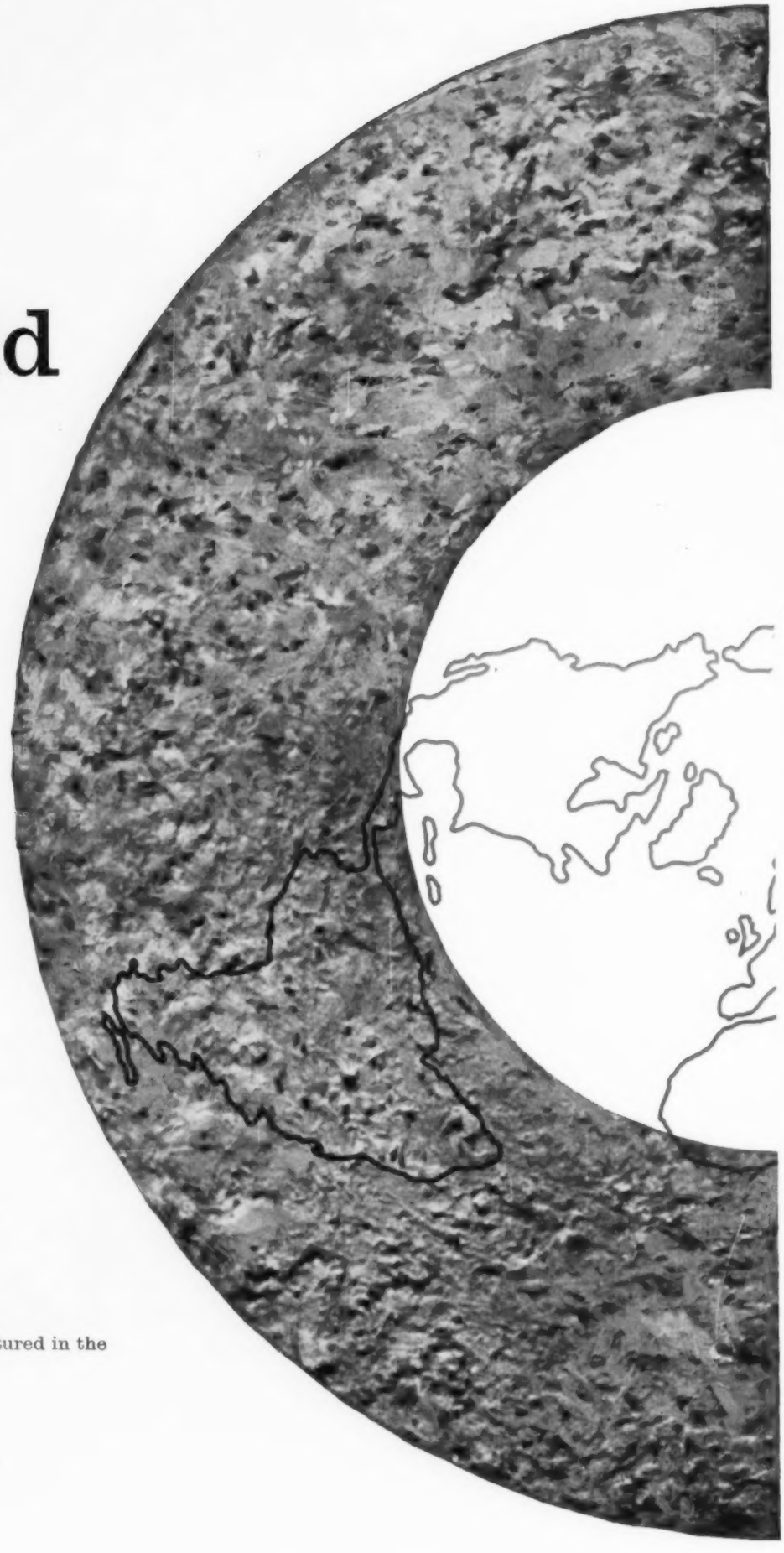
WHERE in the WORLD do you need construction?

ENGINEERS — CONSTRUCTORS

NEW YORK... WASHINGTON... LOUISVILLE ... MINNEAPOLIS... CARACAS ... BOGOTA... LA PAZ ... EDMONTON... CALGARY... LONDON... ANKARA... TEHRAN

made the world over

and to the same specification



Caposite amosite asbestos moulded insulation is manufactured under supervision to the same uniform specification in all these countries.

Great Britain
by Cape Insulation & Asbestos Products Ltd.

Canada
by Caposite Insulations Ltd.

South Africa
by Cape Asbestos Insulations (Pty) Ltd.

Australia
by James Hardie & Company Ltd.

France (as 'Isolamiante')
by Isolamiante SA

Italy
by Capamianto SpA

Holland
by J. de Boer & Company

Spain
by Messrs. Eduardo Rosa

Argentina
by Montisol Argentina SRL

Japan
by Nippon Asbestos Company

Amosite asbestos insulation is also manufactured in the **U.S.A.** under the name of 'Unibestos'
by Union Asbestos & Rubber Company

Cape Insulation

& ASBESTOS PRODUCTS LIMITED

114 & 116 Park Street, London, W1
Telephone: GROsvenor 6022
Cables: Incorrupt London.
Enquiries to:
Cape Asbestos (Canada) Limited
200 Bloor Street East, Toronto, Ont.
Capamianto SpA
via Sant' Antonino 57, Turin, Italy.

CAPOSITE

REGD.

AMOSITE ASBESTOS INSULATION

CAPE

TA 3612

IRAQ

EXPLORATION: No discoveries of importance were reported in the group area during 1960. There follows a summary of 1960 activity by company.

Iraq Petroleum Co. (IPC): At the beginning of 1960, Pulkhana 6, southeast of Kirkuk, was drilling at 1,780 ft. The well was abandoned as a dry hole in March after having reached 4,985 ft. Gilabat 2, also southeast of Kirkuk, had reached 5,162 ft in July, when operations were suspended. In July, Qara Chanq 1, west of Kirkuk, was spudded in; it was drilling at 5,820 ft at the end of September. Demir Dagh 1 was spudded in during March, but was abandoned at 8,755 ft in September. In September, deepening operations began at Chemchemal 2. Chemchemal had previously reached 7,407 ft in 1953, and was then suspended.

Basrah Petroleum Co. (BPC): In May 1960, Tuba 1, between Rumaila and Zubair fields, was abandoned at 11,940 ft. Kifl 1, in the northern part of the concession area, was abandoned in July at 10,684 ft. In February, Shawiya 1 was spudded in, but abandoned in April at 5,860 ft. Dujaila 1 was spudded in during May, and was drilling at 10,687 ft in September. Ghalaisan 1, spudded in during May, was abandoned in July at 6,533 ft. In August, Safawi 1 was spudded in, and in September Afaq 1 became BPC's latest exploration well.

Mosul Petroleum Co. (MPC): Drilling continued at Samarra 1 until May, when the well was abandoned at 11,511 ft. Alan 2 was spudded in during June, and had reached 5,448 ft at the end of September 1960.

On August 3, 1960, the Iraq government invited offers, to be submitted within six months, for oil exploration and development in Iraq's territorial and contiguous waters. The area of the territorial waters, which Iraq has declared to extend to 12 nautical miles from the coast, was relinquished by the Basrah Petroleum Co. at the end of 1958.

PRODUCTION: Production rates in Iraq increased to average 1,042,212 b/d in September 1960 from 900,780 b/d in January. Total production for the first nine months was 34,332,000 long tons. Estimated 1960 production is 963,745 b/d.

Production Capacity: IPC has a major expansion plan slated for completion in stages at both Mediterranean and Persian Gulf terminals. Another 460,000 b/d capacity will be added in 1961 and 1962. By then, 1958 capacity will have been nearly doubled, to a total of 1.4 million barrels daily: 960,000 b/d at the Mediterranean, and 440,000 b/d at the gulf.

Work is progressing in the Persian Gulf on a 200,000 b/d offshore loading facility at Khor al-Amaya, which will provide a new deep-water export terminal for the IPC group's production in southern Iraq. The artificial "island" terminal may be ready to go into partial operation in mid-1961. When completed in early 1962, IPC's export capacity at the Persian Gulf will total 440,000 b/d, including 240,000 b/d at its shallow-water facilities at Fao.

Reserves: Proved oil reserves in Iraq are estimated at 25 billion barrels, equivalent to 3.35 billion metric tons.

TRANSPORTATION: With completion of more than 450 miles of loop lines paralleling the Kirkuk-Mediterranean pipeline system, throughput in northern Iraq increased during 1960 to a rate of 35.9 million tons per year in September from 30.2 million in January.

OIL LAWS

Complete text of Iraq's oil legislation, and texts of IPC, BPC, and MPC concessions, have been published in a noteworthy collection *"Middle East—Basic Oil Laws and Concession Contracts."* It is a word-for-word compilation of applicable laws, an interesting and useful collection which includes oil laws and concession texts for the other countries of the Middle East as well. For information, address the publisher directly: *Petroleum Legislation Ltd., P. O. Box 1591, Grand Central Station, New York 17, N. Y.*

NATIONAL FACTORS

A detailed study of petroleum in Iraq was

CONTRACTORS TO THE OIL INDUSTRY

30"/32" diameter pipeline for the Iraq Petroleum Company Ltd., under construction from the Tripoli Tank Farm to the Syrian border in North Lebanon. Coat and wrap machine in operation.

Suppliers and Builders of Steel Tanks of all kinds, Pressure Vessels, etc.

Civil Engineering and Building Contractors.

Pipe lines, pump stations, power stations, degassing stations, steel buildings, residential and office buildings, etc.

MOTHERWELL BRIDGE CONTRACTING AND TRADING COMPANY, LTD.

Offices and Branches in:

Baghdad • Kirkuk • Basrah • Damascus • Kuwait • Bahrain • Qatar
Aden • Karachi • Nicosia • Tripoli • Benghazi • Teheran • West Africa

London Office: 23 Princes Gate, London, S.W.7, (Tel. Knightsbridge 0701)
Middle East Headquarters . . . P. O. BOX 1036, BEIRUT, LEBANON

published during early 1961 under the title *"International Taxation Series."* This series is devoted exclusively to petroleum taxation, covering every type of tax imposed on petroleum operations in all countries. Marketing, refining, transportation, exploration, and production taxes are covered, with a separate study of each. For an example of one of these national studies (all are prepared in exactly the same format), readers are referred to the Colombia section of this issue of *World Petroleum Report*, i.e., the section entitled "Colombia—Petroleum Industry Taxation." Requests for information on the entire series should be addressed to *International Taxation Series, P. O. Box 2744, Grand Central Station, New York 17, N. Y.* END

KUWAIT

The outstanding event of 1960 and early 1961 in the Middle East was the bidding on Kuwait's offshore acreage, some 1,500 square miles, and its award to the Royal Dutch/Shell group in December 1960. As of mid-January 1961, the final concession contracts had not been signed; however, agreement in principle had been announced by the government and by Shell. With Kuwait's oil reserves approaching one-fourth the entire world's, the grant may seem a major source of crude for Shell which, although one of the world's largest oil companies, has never had enough Middle East production despite a share in the consortium in Iran (14%), in Iraq Petroleum Co. (23¾%), and a small production in Egypt.

The terms under which Shell obtained this concession are outlined under the *Oil Law* section hereinafter. The government's plans for operating its own oil company are outlined in the *Marketing* section hereinafter. Shell expects to complete a seismic survey during the first half of 1960, and to spud its first well early in 1962.

EXPLORATION: Exploration in Kuwait is carried out by the only operating concessionaire company, Kuwait Oil Co. (KOC). During 1960, the following drilling was done (this résumé excludes the Neutral Zone, onshore and offshore, which is the subject of a separate section):

Minagish 1: This well was drilled at Minagish (31 miles west of Ahmadi town) and found an oölitic development of the Ratawi limestone. The company stated "full assessment of its potentialties must await the completion of a flow line and production facilities. Press reports indicated it tested 10,000 b/d of 34.8 gravity crude with a well-head pressure of 600 psi. The well went to 11,614 ft after unusually high formation pressures had been encountered in the anhydrite series below the Ratawi, but was completed in the Ratawi limestone with 7-in. casing at 11,253 ft.

Minagish 2: This well was spudded in September 1960 to help define the structure and extent of the Minagish reservoir rocks. Its location is about one mile southwest of No. 1.

Dibdibba 1: Drilling at this location, about 25 miles northwest of Minagish 1, was suspended after the well head reached the Mauddud limestone. Total depth reported was 9,438 ft.

Mutriba 1: Operations at this well, which had been resumed in July 1959, were discontinued in November 1960, and it is now proposed to drill a new well to explore deeper horizons on this structure. It went to 11,516 ft, where a combination of mechanical reasons halted operations.

PRODUCTION: Development Drilling by Kuwait Oil Co. (KOC): During 1960, KOC drilled 17 wells in the mammoth Burgan field. All were producers. Their average depth was about 4,500 ft.

In Minagish field, two wells were completed as producers during 1960. Their average depth was 10,000 ft.

With the completion of No. 15 gathering center and the 30-in. pipeline from Raudhatan to Ahmadi, in April 1960 the North Kuwait fields were brought into production. The Minagish field came into production in July. Three wells have been completed at Minagish, and a fourth was being drilled at the end of 1960.

Production in Kuwait during 1960 averaged 1,623,711 b/d.

Gas Utilization: During 1960, construction in the Burgan field of a plant to inject 100 million cubic feet of gas a day into the oil-bearing formation continued.

REFINING: Refinery throughput was maintained at a higher average rate in 1960 than during the previous year. Crude oil processed in the first nine months of 1960 was 48,083,182 bbl, compared with 39,158,716 in the same period of 1959.

OIL LAWS

For a detailed and highly recommended study of petroleum-industry legislation and regulation within Kuwait, the editor highly recommends *"Petroleum Legislation."* This is a legislative reference service containing a summary and analysis of the concession contract of Kuwait Oil Co. and other industry regulation for the remainder of the Middle East and other major countries of the world. The reviews are kept up-to-date by loose-leaf revision service. For information on this excellent service, the publisher may be contacted directly at *Petroleum Legislation Ltd., P. O. Box 1591, Grand Central Station, New York 17, N. Y.*

SHELL OFFSHORE CONCESSION IN KUWAIT

During December 1960, the offshore concession area of Kuwait was granted to the Shell group. Shell's new company to handle all matters related to the concession is Kuwait Shell Petroleum Development Co. Ltd. **Duration:** 45 years. **Yearly Rental:** $2.8 million (one million pounds) during each of two years; $5.6 million each following year until exports begin. **Bonus Payments:** Total, about $74 million. $19.6 million bonus payable on signature of the concession agreement. $19.6 million is payable at the end of the fourth year, or on reaching 100,000 b/d, whichever is earlier. In addition to these, bonuses consist of four equal installments of $11.2 million (payable in pounds) each when production reaches 200,000 b/d, 300,000 b/d, 400,000 b/d, and 500,000 b/d. **Surrender:** Shell can surrender at end of three years, on payment of its three years' rentals, plus the original bonus, for a total of $30.8 million.

Shell cedes the government the right to purchase 20% participation if oil is found. The government is carried on exploratory risk; but would be required to pay its share of exploration costs up to the time of participation, and its share of all development and exploration costs thereafter. An unusual aspect is the handling of the government's share of production. It may be received in kind or in cash, with Shell to market it at posted price minus 10% or actual realization, whichever is higher, until the government can handle it itself. The government, according to press reports, plans to turn the 20% share in production over to its new National Oil Co., which is to enter into overseas marketing, transportation, and refining "with the friendly cooperation" of Shell. The government considers this a firm commitment on Shell's part to assist it in the start of an integrated oil operation.

NATIONAL FACTORS

National Oil Company: The agreement with Shell providing for 20% participation by the government is the first ever concluded by a major oil company in the Middle East. The government of Kuwait intends to venture step by step on the road to management of an integrated company, looking forward to the day some 40 to 65 years ahead when concessions will expire. The government, presumably through the new Kuwait National Oil Co., plans to hire experienced persons to aid in the initial management, with the head of the company to be a Kuwaiti, possibly Sayid Ahmed Said Omar, deputy director of Kuwait's finance department and head of the department's oil office. 40% of the company would be owned by private parties, and that amount of its stock has already been sold.

Initially, the company took over, in January 1961, local distribution and marketing facilities of Kuwait Oil Co. (owned equally by British Petroleum and Gulf Oil Co.), which include about 15 service stations. However, international bunkering remained with KOC. KOC is supplying the national oil company with local market requirements at cost. Eventually, the government plans to form a national drilling company, and may some day also enter into direct production on surrendered areas. Production until that time will be derived from the Japanese concession, which already has a discovery, and from any future discoveries made by Shell in the offshore area. Uutil the national company is functioning, Shell will handle Kuwait's 20% share of production—marketing it at posted prices minus 10%, or actual realization, whichever is higher. END

QATAR

There are two principal concessions in Qatar. The onshore area of Qatar is held by Qatar Petroleum Co. Ltd. (QPC), and the offshore are by Shell Co. of Qatar (see OIL LAWS section hereinafter).

EXPLORATION: During 1960, no exploration is known to have been conducted on the mainland, which produces from a single field, Dukhan. Shell Co. of Qatar, however, has been actively drilling with a new offshore platform since the first of 1960, a replacement to

the previous platform which had been destroyed in a storm during 1956. Shell reported that oil was found with the new platform in the Middle Jurassic during 1960 at the company's third wildcat, Idd El Shargi 2. It is located 52 miles east of Qatar peninsula. The rig then was moved to No. 1 Hadet Shibeeb, 26 miles off Doha, where a dry hole was drilled. The company returned to drill El Shargi 3 stepout, 1½ miles south of No. 2 discovery well. More oil shows were reported, and the company is drilling additional wells on the structure.

Qatar Petroleum Co. Ltd. drilled a deep test, Dukhan 65, to 13,261 ft in the last days of 1959. It was completed as an observation well, much to the company's disappointment. No exploratory drilling was reported in 1960.

PRODUCTION: During 1960, production by Qatar Petroleum Co. averaged 173,629 b/d. This is a rise from average 170,403 b/d in 1959, but a decrease from the 1958 average of 175,096 b/d.

Reserves: Proved reserves are estimated at 2,500 million barrels, equivalent to about 320 million tons. This estimate does not include any of the recent offshore oil finds by Shell Co. of Qatar.

TRANSPORTATION, REFINING, MARKETING: The Qatar government is to build 50 miles of 10-in. pipeline and 10 miles of 6-in. to take gas from the Qatar Petroleum Co.'s Dukhan field to the capital, Doha, for use in power stations, water-distillation plants, and other installations.

There is only one refinery, a small 600 b/d plant owned by QPC to supply local needs. It is to be expanded to 1,800 b/d by 1963. Marketing needs within Qatar are very small.

LEGAL REGULATION OF THE PETROLEUM INDUSTRY

The Shaikhdom of Qatar has no petroleum or mineral law. Principal oil regulation exists in the form of two long-term concessions for oil. One of these concessions covers almost the whole of the land area of Qatar and its territorial waters. It is held by Qatar Petroleum Co. Ltd., an associate of Iraq Petroleum Co. with the same shareholding. The other concession covers offshore areas of Qatar outside territorial waters. It is held by Shell Co. of Qatar Limited, a wholly owned subsidiary of the Royal Dutch/Shell group.

QATAR PETROLEUM CO. CONCESSION[1]

The original concession was obtained by the Anglo-Iranian Oil Co. Ltd., but was assigned to Petroleum Development (Qatar) Ltd. (an associate of Iraq Petroleum Co. Ltd.) on August 21, 1936. Since this time, the terms of the concession have been several times amended and brought up-to-date to give the Ruler 50% of the profits arising from the operations of the company in Qatar. The main amendments to the original concession occurred in the 1952, 1955, and 1958 agreements, and also in a series of letters exchanged between the Ruler and the company which by 1955 had changed its name to Qatar Petroleum Co. All references to "company" in the following review refer to QPC.

The concession is for production with pipeline and refinery rights.

Duration: 75 years from May 17, 1935. **Area:** The land area, save for a narrow strip to the north of the Qatar-Saudi Arabian border, and territorial waters of Qatar, with the exception of the land surrounding Riyan as defined by the Sheikh, the area surrounding the castle of the Sheikh at Doha, and land used for religious purposes. **Royalties:** A royalty on all exported oil equal to 12½% of the posted price. A royalty on asphalt and ozokerite won and saved into storage of one rupee 8 annas per long ton. A royalty of 2 annas per 1,000 cubic feet of natural gas produced and sold (one rupee equals 20 US cents).

50-50: The company undertakes to pay the Ruler such an amount (the makeup payment) as when added to royalties and income tax and in respect of profits arising from dealing in oil in Qatar, totals 50% of the profits arising from the company's operations in Qatar (profits are defined as the difference between the cost and posted price less selling expenses and incentive discounts, if any).

Minimum Guarantee: The company undertakes that the Ruler's revenues from the company's operations will not fall below (a) a rate of 750,000 pounds per year during any period in which the company's operations are suspended by *force majeure*. Any payments under this arrangement are to be treated as advances against future royalties. This provision is suspended when advances total 1 500,000 pounds per year in normal circumstances.

Incentive Discounts: By a letter of August 7, 1955, incentive discounts of 7½% of posted price for exports in excess of five million long tons per year, and of 10% in excess of seven million long tons per year were agreed. This arrangement continued for some time, but there are at present no incentive discounts in force.

Free Supply to the Sheikh, either in cash or kind, is made as follows: 40,000 gal of gasoline per year; 20,000 gal of kerosine per year.

Lump Sum Payments: Payment was made on signature of the original agreement of 400,000 rupees.

Rentals: Payment of rent as follows: Rs. (rupees) 150,000 at the end of each of the first five years; Rs. 300,000 at the end of the sixth and every subsequent year for the duration of the concession.

Other: By a letter agreement of May 17, 1935, the company undertook to drill two artesian wells free of charge, and to pay the salaries of one or two "informed persons" employed in Qatar as advisers to the Sheikh; salaries to be reasonable and in keeping with the duties and positions of the advisers.

Company Rights and Obligations: Company has right to construct, maintain and operate pipelines, refineries, and any works likely to be required for an oil concession; right to explore, prospect drill for, extract, ship, and export; and the right to refine and sell petroleum, natural gas, ozokerite, asphalt, and their derivatives. Obligation to explore the State of Qatar minutely by any methods necessary to ascertain the probable existence of petroleum and similar substances. Obligation to acknowledge the Sheikh's authority and his rights, and to respect them in every way.

Company has right to use and occupy uncultivated lands belonging to the Sheikh free of charge. No right to acquire lands occupied by the enterprise of the owners thereof and houses, places and lands which their owners decline to sell or rent; right to acquire any other houses, places, lands, etc. as the occasion arises.

Transportation: Company has right to construct, maintain, and operate roads and railways and to use all means of transport required for company operations, except aerial transport; obligation to obtain the permission of the Sheikh on every occasion of an aerial landing in Qatar. Obligation to allow the Sheikh full use of company transportation for his personal business, and for government purposes, in case of need, free of charge.

Harbor and Port Facilities: Company has right to use ordinary ports at Doha for importing materials, and to select the most suitable port for exporting substances. Obligation to allow the Sheikh to use the ports used and constructed by the company, and to afford him all facilities in this respect.

Building Materials: Access, free of charge to earth, mud, gravels, etc. No right to export these building materials.

Water: Access, free of charge, to water required for company operations, provided no loss or damage is caused to inhabitants of Qatar. Right, subject to conditions as above, to explore, drill and impound water to satisfy company requirements.

Telephone and Telegraph: Right to construct, maintain, and operate telephone and telegraph installations. Obligation to allow the Sheikh full use of such telegraph lines, wireless installations, telephones, etc., for his personal business, and for governmental purposes in case of need, free of charge.

Labor: Obligation to employ subjects of the Sheikh or persons approved by him except employees who cannot be found within the country. Obligation to dismiss any employees disapproved by the Sheikh. Obligation to pay reasonable wages to employees who are subjects of the Sheikh.

Taxation: In consideration for a tax commutation payment of 20,000 pounds per year, the company has complete exemption from (a) all taxation in Qatar whether state or municipal; (b) all customs and other duties on any items required for the company's operations imported into Qatar, provided duty is paid for any items imported for the personal use of employees of the company or which are resold in Qatar.

Government Protection: Obligation on Ruler to protect company's property and employees as far as possible. By the 1952 agreement, in consideration of a payment of 20,000 pounds per year by the company, the Sheikh will provide trained policemen to protect the company; they will be housed, etc., at company expense. Sheikh has right to grant concessions to other parties for anything except substances mentioned in the agreement. Right to inspect drawings, maps records, and other data of the company.

Extension or Renewal: Agreement provides for the disposition of the company's property upon expiration of the concession or at the end of any "extension or renewal."

Termination: Right to terminate the concession upon six months' advance notice in writing to the Sheikh; no right to abandon or cancel the concession or discontinue operations except after three years from the beginning of operations. If notice is given not later than 35 years from the date of the ageemernt, all lands granted by the Sheikh and any lands or buildings purchased by the company or buildings or houses constructed by, or any immovable properties belonging to the company, to be surrendered to the Sheikh free of charge; producing wells to be surrendered in good and satisfactory condition. If notice of cancellation is given after 35 years from the date of the agreement or upon termination of the agreement, all properties of the company to be surrendered to the Sheikh free of charge, and all producing wells turned over in reasonably good and satisfactory condition. Convention subject to cancellation by the Sheikh (a) if the company fails to make payments due to the Sheikh within six months from the due date, (b) if the company is in default according to the provisions for arbitration.

Transfer of Concession: Right, with the prior assent of the Sheikh, to transfer agreement to any other commercial company provided the said company is able to fulfill the obligations of the agreement and its engagements entirely. No right to transfer the concession to any government.

Force Majeure: Sheikh not to hold the company liable if the company defaults in carrying out or fulfilling provisions of the agreement by the mere occurrence of *force majeure* delaying operations.

Arbitration: Arbitration by two arbitrators, one to be appointed by the Sheikh and one by the company; each party to appoint its arbitrator within 30 days after receipt of request to do so; two arbitrators to appoint a third or, failing agreement between them, within 60 days from the demand for arbitration, the third abitrator to be appointed by the British political resident with the consent of the Sheikh.

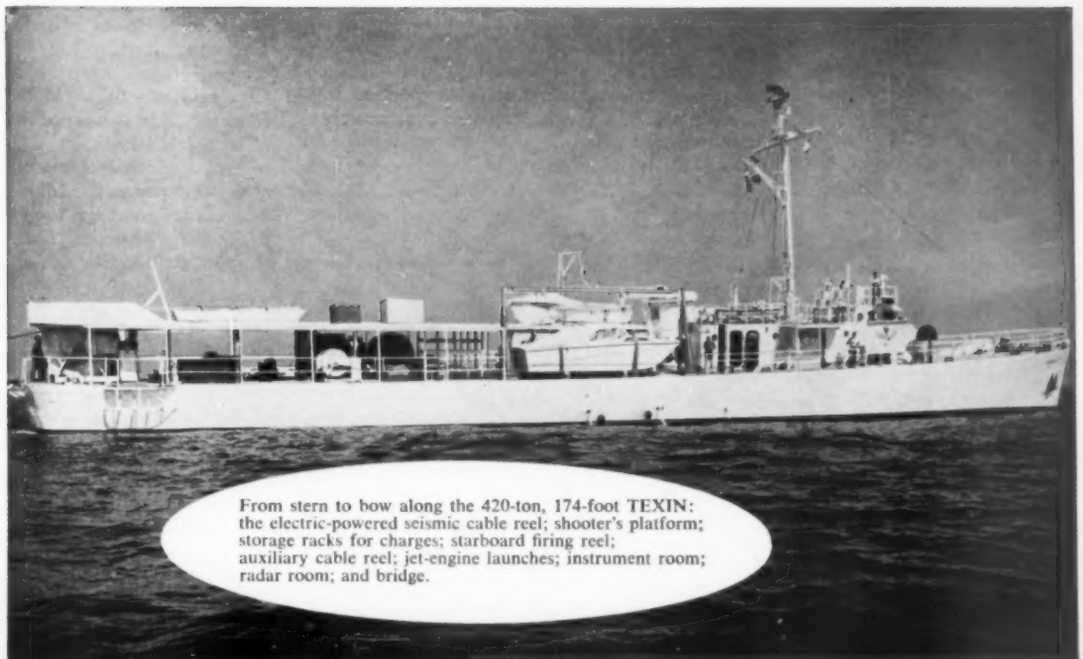
Arbitration award to be consistent with the legal principles familiar to civilized nations. Decision of the majority of arbitrators to be final. Place of arbitration to be Qatar.

Official Text: English and Arabic; in case of any difference of interpretation or in meaning, the Arabic text to prevail.

Sterling: All sums previously expressed in rupees shall be deemed to be expressed in sterling at a rate of one shilling and sixpence for one rupee (1952 agreement).

Income Tax: There is a general Income Tax Law in Qatar which has been made applicable to foreign companies. This provides for income tax on a sliding scale, but on income in excess of five million rupees per annum the tax rate is 50%. For the purpose of collection, the amount of tax due is reduced by the aggregate of any royalties, duties, imposts, or other exactions of a like nature. This law is dated September 24 1955, and amends an earlier Income Tax Law of April 23, 1954. END

[1]Source: Petroleum Legislation Ltd.



From stern to bow along the 420-ton, 174-foot TEXIN: the electric-powered seismic cable reel; shooter's platform; storage racks for charges; starboard firing reel; auxiliary cable reel; jet-engine launches; instrument room; radar room; and bridge.

EXPLORATION at sea...or in shallow water

Remote coastal areas . . . far distant from supply ports . . . are the scene of many seismic surveys. These areas are best worked with the single-ship method of exploration. GSI's *new* TEXIN, similar to her sister ship the SONIC, travels to your prospect under her own power, arriving equipped and provisioned for an extensive offshore program. Auxiliary, jet-engine launches project data-gathering facilities into water no deeper than 18 inches . . . giving you a complete marine survey . . . from deep water to shoreline.

Write now for Bulletin S 60-1, describing both the TEXIN and SONIC.

GEOPHYSICAL SERVICE INC.
A TEXAS INSTRUMENTS COMPANY
900 EXCHANGE BANK BLDG. • DALLAS 35, TEXAS

LEBANON

EXPLORATION: For a map of concession holdings in Lebanon, refer to *World Petroleum Report 1957*. Drilling began during 1960 by Gewerkschaft Elwerath, a West German firm which had acquired a 50% interest in Cie. Libanaise des Pétroles' 75-year concession. The first of two wells to which the German firm is committed as operator was drilled at El Qaal and abandoned at 8,387 ft as a dry hole. The second well was drilling at Adloun (see map) early in 1961. It was spudded during November 1960.

According to press reports, a new concession for oil and gas exploration was granted to Darwin P. Pearson of Columbus, Nebr., in 1960, covering onshore and offshore areas north and south of Beirut. The grant has not been confirmed, however.

TRANSPORTATION: One of the world's largest crude pipelines, Tapline, crosses Lebanon. During 1960, its crude throughput declined to about 50% capacity due to competition by tankers which are currently operating at very low rates. Tapline is reducing its marine facilities at its Sidon pipeline terminal because its deliveries of Saudi Arabian crude to the Mediterranean have dropped.

REFINING: There are two refineries in Tripoli: IPC's Tripoli (Lebanon) refinery continued to operate at about half-capacity in 1960. The Medreco plant at Sidon operated at close to capacity during 1960.

OIL LAWS

The complete text of Lebanon's oil legislation (including the Cie. Libanaise concession) has been published in a noteworthy collection: *"Middle East—Basic Oil Laws and Concession Contracts."* It is a word-for-word compilation of applicable laws, an interesting and useful collection which includes oil regulation for the other countries of the Middle East as well. For information, address the published directly: *Petroleum Legislation Ltd., P. O. Box 1591, Grand Central Station, New York 17, N. Y.*

END

NEUTRAL ZONE

The Neutral Zone is owned in undivided half-interest by the Kingdoms of Kuwait and Saudi Arabia, under a treaty signed in 1922. The two governments are now considering dividing the zone into two parts, and the oil companies are concerned about the effect this may have on their operations.

There are two main areas of operation. Onshore operations are divided between Getty Oil Co. and American Independent Oil Co. (Aminoil). Getty Oil is 81% controlled by the American, Paul Getty. Aminoil is composed of a number of independent American companies (see *WPR 1960* for a review of their names and interests), and is headed by D. C. Dnaway, president. The offshore area is held by Japanese interests which hold two concession agreements—one with Saudi Arabia, and the other with Kuwait—covering the same area.

Onshore Exploration During 1960: Aminoil and Getty Oil operate jointly over the land area, under a complicated understanding for sharing costs. Little exploration has been done in recent years, the companies being fully occupied with developing their Wafra field. However, they have an exploration campaign under way, with an exploratory well drilling less than a mile from the Japanese land-base camp of Khor-Al-Muffata at the end of 1960.

Official data for 1960 show: 73 producing wells and 7 dry holes drilled, mostly to 2,000-foot Eocene level but a few deep 7,000-foot Ratawi wells.

At the end of 1960 the companies had 280 total wells in the field, 248 of which were producible, and 197 of which were producing a total of 155,000 b/d of 17 to 25 API crude.

There was 40,000 BCD refining capacity. Another refinery is to be added.

Approximately 50 million barrels of oil were produced and shipped during 1960. Specific destinations are confidential but it was marketed generally in Europe and the Far East.

Aminoil and Getty plan to drill soon some of the offshore islands which fall within their concession boundaries, and are optimistic about the prospects on these islands. Ownership of two of them has yet to be determined if the split of the Neutral Zone between the two countries takes place.

Offshore Exploration: The Japanese interests which hold the offshore rights are grouped under Arabian Oil Co., headed by Taro Yamashita. The company has been very successful, and found a major field with its first offshore wildcat at Khafji (see map). There, the Japanese completed their offshore drilling program for 1960, with eight producers out of eight tests drilled. Potential of each of the two latest Khafji wells was given as 8,400 b/d, somewhat better than the 6,000 b/d to 7,000 b/d average of the first six.

The company plans to produce at least 40,000 b/d in 1961; 160,000 b/d in 1963; and at least 172,000 b/d in 1964. The company plans to drill a total of 43 wells by 1964.

PRODUCTION: Crude-production levels have continued to rise, averaging 136,000 b/d in 1960.

TRANSPORTATION: Both Getty and Aminoil have separate facilities for transportation of their crude. These have been described in *WPR 1957*, and subsequent additions have enlarged capacities considerably. A new pipeline is planned by Aminoil from the field to its terminal at Mina Abdullah.

REFINING: There are two refineries existing. Getty Oil has a 50,000 b/d plant at Mina Saud. Aminoil has a 50,000 b/d plant at Mina Abdullah in Kuwait, may add another plant soon.

OIL LAWS

No major changes occurred in the oil regulation of the Neutral Zone during 1960. There is no petroleum or mineral law governing this region; instead, regulation is effectively carried out under the terms of concession contracts of which there are four in the area. Two are with the government of Saudi Arabia: the Getty Oil contract and the Japanese offshore agreement. Two are with the government of Kuwait: another Japanese offshore agreement, and the Aminoil concession. The texts of all of these are available in English translation from *Petroleum Legislation Ltd., P. O. Box 1591, Grand Central Station, New York 17, N. Y.* Excellent summaries have been prepared, based on the Arabic and English texts, published in a legislative reference service known as *Petroleum Legislation*. It is also available from the same source as given above.

American Independent Oil and Getty Oil attempted in 1960 to work out a coordination of their activities in the Neutral Zone. Each company now operates there individually. However, for economic reasons, no agreement was reached.

END

SAUDI ARABIA

The entire country of Saudi Arabia, excepting only those areas recently surrendered by Aramco and those offshore areas of the Kuwait-Saudi Arab Neutral Zone held under concession by a Japanese group, Arabian Oil Co., is held by Arabian American Oil Co. (known as Aramco). There follows a résumé of Aramco's operations in 1960 which, in effect, are the oil operations of Saudi Arabia proper. For oil operations in Saudi Arabia in prior years, see 1957 through 1960 issues of *World Petroleum Report*.

EXPLORATION: Four exploration parties operated in outlying parts of the concession area of the Arabian American Oil Co. (Aramco) in Saudi Arabia during 1960. Two of these were seismograph parties; the other two were structure-drill parties. During the latter part of the year, following the usual shutdown of exploration activities during the hot summer season, both structure-drill parties and one seismograph party were operating in the Sand Mountain area in the eastern Rub' al-Khali. The other seismograph party was operating in the interior homocline area in the west-central Rub' al-Khali.

Drilling: During the first nine months of 1960, Aramco completed 11 deep wells—of which two were completed as oil wells in the Khurais field near the western boundary of the concession area, and two oil wells in the offshore Manifa field. Two oil and two observation wells were completed in the 'Ain Dar area of Ghawar field; one oil well at Abu Hadriya; and one oil and one observation in the offshore Safaniya field. Aramco has now completed its program of delineation drilling at both Khurais and Manifa.

In the Abu Hadriya field (discovered in 1940), Aramco has a third potential producer with completion of No. 6. The new find in the 35-gravity field is 3½ miles west of the dis-

SAUDI ARABIA—Crude-Oil Production by Fields, 1960

	Total Barrels Jan.-Sept.	Jan.-Sept. Barrels Per Day
GHAWAR	195,680,220	714,161
ABQAIQ	76,605,123	279,581
DAMMAM	9,527,621	34,772
QATIF	4,251,293	15,516
SAFANIYA	46,335,880	169,109
KHURAIS	2,400	9
KHURSANIYAH	25,098	92
	332,427,635	1,213,240

covery well—with oil discovered in the Hadriya zone, the same as in No. 1. Hadriya No. 1 and No. 5 are now shut in; and No. 7 (in the Arab zone) is being drilled 6½ miles southeast of No. 1.

Following completion of Manifa No. 7 at 8,528 ft. early in June, the well was plugged back to 7,993 ft. because of mechanical difficulties; and Aramco's offshore drilling rig was returned to Safaniya for delineation development drilling there. (For earlier details on Manifa drilling, see *WPR* 1960, p. 85.)

Reserves: Aramco's proved recoverable oil reserves, as of January 1, 1960, were estimated by the company at approximately 38.6 billion barrels—1.9 billion greater than the estimate for a year earlier.

PRODUCTION: Average daily crude output during October of 1,310,373 b/d established a new monthly production record. Daily average for all of 1959 was 1,095,339 bbl, and for 1960 was 1,247,140 bbl.

TRANSPORTATION: With completion by Aramco of a gas-oil separator at Khursaniyah and the $9 million 65-mile 30-in. KRT-2 loop of the 22-in. Khursaniyah-to-Ras Tanura pipeline; the Khursaniyah field was placed on production in October 1960—becoming the sixth of Aramco's 10 producing fields after Dammam, Qatif, Abqaiq, Ghawar, and Safaniya. Carrying 215,000 b/d of Safaniya crude to Ras Tanura, the KRT-2 loop permits simultaneous shipments of Khursaniyah and Safaniya crudes to the Ras Tanura refinery instead of batching the two crudes through the 22-in. SRT-1 Safaniya-Ras Tanura-1 line. Safaniya crude is still pumped to Khursaniyah through a portion of the 22-in. line.

A fifth pipeline from Qatif Junction to Ras Tanura—largest diameter line ever laid in Saudi Arabia—was completed and placed in operation during July 1960. Completion of the under-water section (over the Tarut Bay channel) of the 19-mile 34-in. to 36-in. QRT No. 5 line is part of the overall pipeline system carrying crude from Abaqaiq to Ras Tanura. It makes possible shipment of an additional 200,000 b/d of stabilized crude above the line's 450,000 b/d capacity. Estimated cost of the QRT No. 5 project is $3.7 million. At Ras Tanura, the line is joined to the 30-in. T-12 tie-line from the refinery to Ras Tanura terminal, providing for the first time a continuous connection from Abqaiq to Ras Tanura through 30-in. or larger pipes.

The bulk of Aramco's crude production during 1960 was exported through the port of Ras Tanura on the Persian Gulf coast of Saudi Arabia. Transportation of crude via the Trans-Arabian pipeline system was at the lowest level in 10 years.

Sour 31- to-32-gravity crude from the Khursaniyah field started flowing into the export market in October for the first time since the field's discovery in 1956. Export capacity for the remainder of 1960 is estimated at 75,000 b/d from five producing wells. The crude is being delivered to Ras Tanura through Aramco's 22-in. Safaniya-Ras Tanura pipeline, on which a partial 30-in. loop was completed during 1960.

NATURAL GAS: It has been estimated that by 1962 the natural gas produced in association with crude oil in Saudi Arabia will have increased to 750 million cubic feet per day, of which 200 million will be a surplus which, if not used, will have to be flared away.

REFINING-MARKETING: September 1960 set a refining record, with an average of 252,088 b/d of crude run to stills at the Aramco refinery at Ras Tanura. The previous record of 250,446 b/d was set in February of 1954. Refining figures for 1960 are given in the accompanying table on crude production and runs to stills by Aramco.

A $20 million 20,000 b/d refinery is to be built by the end of 1962 near Jiddah for a new Saudi company, Saudi Arabian Refining Co. (Sarco).

OIL LAWS

Concession texts for the various Middle Eastern countries are becoming more available since their publication in English translation in *Middle East—Basic Oil Laws and Concession Contracts*. This is a series of volumes dealing with petroleum law and concession contracts in all countries, including especially Saudi Arabia. The text of the Aramco concession is contained in this series, along with amending letters and similar agreements comprising in total the oil regulation of Saudi Arabia. The Getty Oil Co. (formerly Pacific Western) concession over the Saudi Arab half of the Neutral Zone is also contained. New concessions, such as the recent Shell agreement in Kuwait, are sent out also in bound supplements to this initial series. For information please contact the publisher directly at: *Petroleum Legislation Ltd., Post Office Box 1591, Grand Central Station, New York 17, New York.* END

SYRIA

For a map of Syrian concessions and well locations, refer to previous issues of *World Petroleum Report*.

EXPLORATION: There was only one private company exploring at the end of 1960. Known as Concordia, it is a subsidiary of a German company, Deutsche Erdoel AG. In 1960, Concordia SARL terminated two dry wildcats (the Toueman and Tschembe wells) and one oil-bearing extension well, for a total of 2,364 meters drilled. One further extension well in the Souedie area was still drilling at the year's end.

In March 1960, a four-year renewal of a reduced area for further exploration was obtained, and some of the exploration permits were relinquished.

Agip Mineraria, affiliated with the Italian State-owned ENI, has obtained rights for "preliminary" geological exploration in the Central Desert of central and southern Syria between the Euphrates River, Homs, and Damascus, it is reported.

A small topping plant, to process about 4,000 b/d was being erected at Kamichly, near the field. Among other purchases in mid-1960, GPA ordered a sizeable quantity of drill-stem testing tools.

Ausonia Mineraria, an independent Italian company, has obtained 50% working interest in the Karatchok field, and will be the operator for future production there. The arrangement has been described as a 50-50 profits split, similar to the Oriental Petroleum arrangement in Egypt.

REFINING: The 20,000 b/d refinery at Homs along the IPC pipelines near the coast was completed in 1959.

OIL LAWS

For a detailed and highly recommended study of petroleum-industry legislation and regulation within Syria and the UAR, the editor highly recommends *Petroleum Legislation*. This is a legislative reference service containing a summary and analysis of the oil laws and other industry regulation for every major country of the world. The national sections are prepared by legal counsel recommended by oil companies who have actually operated within the country concerned. The same oil-law firms keep their reviews up-to-date by loose-leaf revision service. For information on this excellent service, the publisher may be contacted directly at: *Petroleum Legislation Ltd., P. O. Box 1591, Grand Central Station, New York 17, N. Y.*

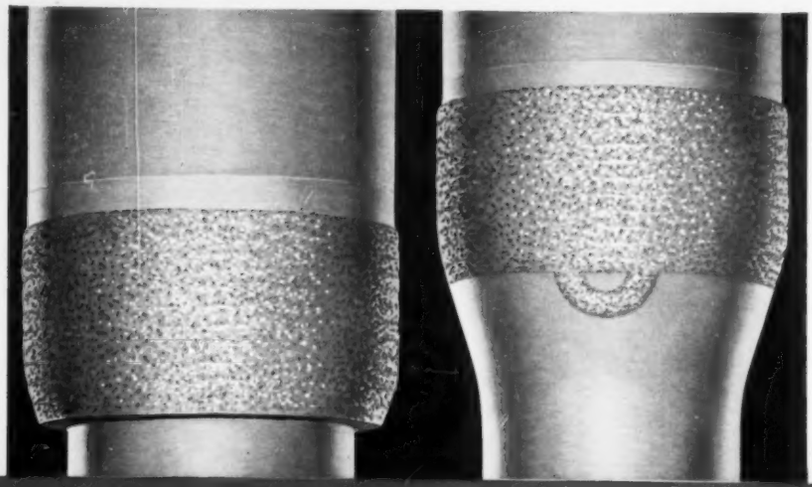
By a recent law, the petroleum law of Egypt was made applicable to the entire UAR region, which makes it applicable to Syria. For a résumé of that law, refer to the Egyptian section of this report. END

YEMEN

No exploration was reported during 1960. British Petroleum has suspended its work on some offshore islands near the Yemen coast.

The status of concessions in this area is always a little hazy. During 1960, it was widely reported that American Overseas Investment Corp. had been given exclusive rights to explore for and develop oil and gas in a 10,000-square-mile area on the northwest coastal plain and offshore coastal waters of Yemen. W. Angie Smith III, formerly of Oklahoma City, said he had signed the concession with the Crown Prince of Yemen, who had acted on behalf of the small Arab kingdom. Mr. Smith is president of the corporation. The firm is owned chiefly by Texas and Louisiana stockholders. Shelby Owens, of Fort Worth, Texas, is chairman of the board. No work was done during 1960.

A Swedish delegation was reportedly in Yemen in 1960 for concession negotiations, accompanied by the Yemeni minister in Lebanon, Dr. 'Adnan Tarsisi. END



Inarclad 60

the newest, longest-wearing hard banding

REED

Reed is proud to announce the newest, most effective method of hard banding tool joints. This new process, "INARCLAD-60," is the result of Reed's accelerated research program. This program entailed several years of research and major expenditures for capital equipment. New production facilities control the entire process from pure tungsten to the INARCLAD-60 applied on the tool joint.

Reed's research in the laboratory and in the field has developed the optimum hard banding for more abrasive resistance and therefore longer tool joint life. Reed now offers, as standard tool joint hard banding, three different applications of tungsten carbide, each of which covers a full three inches on the joint.

For complete details, call your local Reed man or write — REED ROLLER BIT COMPANY, P. O. BOX 2119, HOUSTON 1, TEXAS.

SOUTH AMERICA

For a statistical summary of the physical development of South America's oil industry during 1960, please refer to the table in the World section of this report, headed "Functional Division of World Petroleum Data." Statistical material is centered there.

It was not an exciting year in South America from the exploration viewpoint, but Colombia, Bolivia and Venezuela had discoveries. Venezuela uncovered the thickest oil sand found in the country to date, but the Colombian and Bolivian finds were small and made in very remote isolated areas where only a large find is commercially producible. Brazil received a unanimous negative report from Petrobras geologists, who recommended the world's most expensive campaign in a single country by a single company be discontinued as hopeless.

OIL LAWS

No major changes occurred in South America's basic oil regulation during 1960, but several unusual situations arose. In Perù, legislation was proposed to place a heavy fiscal levy on International Petroleum Co., the country's largest oil producer. In Venezuela, a government decree formed a national oil company designed to participate in all oil operations from exploration through marketing. Argentina released several decrees which further opened the country to international oil contracts.

An unusual publication appeared during 1960. It contains the entire text of the oil laws and concession contracts for all the countries of South America. They are in English translation and kept up to date by supplements to the original volumes. Title of the compilation is *South America—Basic Oil Laws and Concession Contracts.* Information concerning it may be obtained from the publisher, *Petroleum Legislation Ltd., Post Office Box 1591, Grand Central Station, New York 17, New York.* It is highly accurate and the only publication of its kind.

NATIONAL FACTORS

The various factors influencing investment are summarized under the respective country sections. During 1960 a study was completed of taxation in South America which has been published and will be distributed during 1961. Title is *International Taxation Series,* and an example of its contents is contained in the Peruvian section of this report entitled *"Peru—Petroleum Industry Taxation."* For another example, see the section in the Colombian review titled *"Colombia—Petroleum Industry Taxation."* The series will eventually cover the entire world. Inquiries concerning this study should be directed to *International Taxation Series, Post Office Box 2744, Grand Central Station, New York 17, New York.* END

CHILE

EXPLORATION: New fields were discovered during 1960 at Daniel, Posesion, and from the coast at Faro a directional well proved oil also below the Strait. These three fields all are on the mainland and their contribution raised production to over 21,000 b/d at the year's end.

Exploration continued during 1960 in the north part of the country at Tarapacá, Antofagasta and Atacama provinces, and in Aysen and Magallanes in the south. At the end of 1960 exploratory drilling was begun in Tamarugal Pampa (Tarapacá province) and at Salar de Pedernales (Atacama province).

Throughout the year one seismic crew operated in the north of the country, and four in the south. Three geological parties worked in each area during the year.

In December, 1960 an exploratory well was begun in Lago Toro, north of Puerto Natales.

Most important achievement was the extension of the Magellan fields from the island of Tierra del Fuego to the continent north of the Magellan Strait, at Punta Delgada. Punta Delgada and Punta Delgada Este yielded nearly 120,000 bbls. in the first half of 1960, against 150,000 bbls. for the entire former year.

Total number of wells drilled in Magellan fields until July 1, 1960, amounted to 537, of which 204 yielded oil, 88 gas and 245 remained dry, a successful rate of around 60%. While total footage drilled in 1959 amounted to 189,090 meters or around 620,000 feet, total footage for the first semester of 1960 reached only 56,114 meters or around 170,000 feet. Average depth was 7,700 feet.

PRODUCTION: Crude output of Empresa Nacional del Petroleo, the autonomous government entity and the only producer, increased by 16% in 1959 to 17,611 b/d. In the first half of 1960, average daily output increased to around 19,000 b/d.

REFINING & MARKETING: Domestic demand in Chile amounts to about 42,000 b/d. Capacity of the national refinery at Concon, north of Valparasio, was doubled in 1959 by W. M. Kellog & Co., to 44,000 b/d.

TRANSPORTATION: An 8" pipeline from Punta Delgada to the Gregorio terminal on the continental coast, 34 miles long, started operation in July, 1960.

OIL LAWS

Chile is a monopoly under the government's company, ENAP, and one of the oldest petroleum monopolies in the world. Private companies are allowed to refine and market. Exploration and production are reserved to the government.

A law has been proposed which would open the entire country to private exploration and development, however, it is given little chance for passage. A law relaxing the government's monopoly over the northern part of the country has also been proposed and has more chance. However, the northern part is geologically unpromising.

For an accurate and concise review of Chilean oil regulation, prepared by legal counsel within the country, recommendation is made of *Petroleum Legislation,* a legislative reference work for oil that is contained in several volumes and also covers all other countries of the world. Its oil legal reviews are compiled by law firms within the country concerned, that have been recommended by oil companies operating there and these same firms keep their reviews up to date by loose-leaf revision service. Inquiries should be addressed to the publisher directly as follows: *Petroleum Legislation, Ltd., Post Office Box 1591, Grand Central Station, New York 17, New York.*

NATIONAL FACTORS

Other factors which affect Chile's favorability would only be important considerations if the law were modified to permit foreign private participation in petroleum.

Chief among these is the history of governmental instability, although politically the upheavals which have occurred occasionally have not seriously affected business operations within the country.

A detailed study of taxation of petroleum in Chile has been prepared and will be available during early 1961 under the title of "International Taxation Series." This series devoted exclusively to petroleum taxation, covers every type of tax imposed on petroleum operations in all countries. Marketing, refining, transportation, exploration and production taxes are covered, with a separate study of each. For an example of one of these national studies (all are prepared in exactly the same format) readers are referred to the Columbia section of this issue of World Petroleum Report, that section entitled, "Columbia—Petroleum Industry Taxation." Requests for information on the entire series should be addressed to: *"International Taxation Series," Post Office Box 1591, Grand Central Station, New York 17, New York.*

The laws of Chile contain no discriminatory restrictions on foreign capital entering other businesses. Foreign companies are treated on an equal basis with domestic.

Chile put a new monetary unit, the escudo, into circulation on January 1, 1960, worth 1,000 of the old pesos. Years of continuous inflation had devalued the pesos to 1,050 pesos per U. S. dollar. The Chilean government hopes the new money will restore confidence in the nation's currency. END

CHILE PRODUCTION BY ENAP

	1955	1956	1957	1958	1959	Per Cent Increase 1955/59
Drilling						
No. of wells	58	63	68	74	90	55.2
Meters drilled	118,778	125,038	148,530	150,614	189,092	59.2
Production						
Crude Oil (m's)	409,697	563,162	689,499	885,196	1,021,989	149.3
Gas (M.M.'s)	466,428	587,139	796,415	1,335,943	1,814,061	288.9

ARGENTINA

DRILLING IN ARGENTINA*

Drilling by:	1960	1961	1962	1963	1964	Five Year Total 1960-64
YPF	676	721	721	721	721	3,560
Drilling Contractors	593	922	988	988	988	4,479
Private Oil Companies	254	223	220	220	220	1,137
Total Wells	1,523	1,866	1,929	1,929	1,929	9,176

*YPF estimates.

EXPLORATION: Argentina's oil industry is booming under contracts by international companies with the government's YPF. For a brief history of the country's oil industry, see previous editions of World Petroleum Report, particularly the 1957 edition.

Principal exploratory news of 1960 was several government decrees inviting international bids over new areas. The latest of these was in November and opened the southern Flank of the Comodoro Rivadavia area, which is considered very promising. Continental and Ohio companies are negotiating for areas in the north, Esso and Shell are interested in new areas in the new Southern Flank area, according to reports.

Development drilling under production and drilling contracts has been disappointing. Yields per well are much lower than expected, and wells decline fast—sometimes 50% in a year. Because of this Argentina may not reach her goal of self-sufficiency in oil in 1961—and perhaps never.

There follows a résumé of the exploratory and production activities of the various companies within Argentina.

YPF Operations: YPF is operating 74 drilling rigs for its own account,(*) not including the contract rigs. During the first half of 1960 YPF completed 251 wells, of which 197 were oil producers and 54 were dry holes. Total for the country, YPF plus private contractors and companies, was 524 wells during the first half of 1960, which means footage and number of wells will both be about double during the year.

Tennessee Argentina Operations: During 1960 the company maintained two surface parties, one seismic crew and four rigs in operation in Tierra del Fuego. Through October 1960, they had drilled a total of 36 wells, principally in the Arroyo Gama and La Sara fields. All facilities have been built on the island, including tank batteries, terminal facilities and an offshore submarine line for tanker loading. These are being expanded to include additional storage facilities at the terminal.

Tennessee Argentina (subsidiary of Tennessee Gas Transmission Co.) began shipment of oil on 20 August 1960 and in October was shipping approximately 10,000 b/d. It is expected that this figure will increase steadily as drilling continues.

Loeb, Rhoades Operations: L. R. Development Co., affiliate of the New York firm of Carl M. Loeb, Rhoades Co., has four rigs running, all of them operated by Kerr McGee. Three are working in the Mendoza area and one in the south on the company's other contract area. The work is going very fast indeed, with Kerr McGee rigs drilling about two wells per rig monthly. Rigs are drilling around 625 feet per day, with 7,500 feet wells completed in 12 days. Through October, about 120 rigs had been drilled by Kerr McGee for L. R. Development. The company's production was up to 17,800 b/d in July of 1960.

Kerr McGee Operations: In addition to its work for L. R. Development as a drilling contractor, Kerr McGee has a 500-well drilling contract directly with YPF. For reasons of finance YPF stretched the contract recently and one rig was moved to Bolivia by Kerr McGee, leaving four active. Through October 133 wells had been drilled by Kerr McGee under its contract.

Pan American Operations: Pan American Argentina Oil Co., subsidiary of Pan American International, started the Argentine boom when they signed the first of the Argentina production contracts. It was negotiated for Pan American by D. Dunaway, now president of American Independent Oil Co. in the Neutral Zone of the Middle East.

Pan American had completed 180 wells through 31 July 1960, no mean feat in view of the difficult conditions. Two wildcat discoveries had been made, Las Flores with 596 b/d initial production and El Triangulo with 534 b/d. All Pan American's activities are in the Comodoro Rivadavia contract area, which divides into three sub-areas. In Anticlinal Grande field PAG-15 deep test reached 8,455 feet and was completed in shallow regular pay during January 1960. In 1959 deep tests had been drilled in the Cerro Dragon and Canadon Grande fields which found no commercial oil accumulations below the established production levels.

Extension wells included San Augusting PSA-1 well, with 192 b/d production, Los Tamaiscos PLT 1 well, which was dry, and Canadon Petro PCP-1 well, with 392 b/d production. Pan America is drilling new hole with 9 rigs and has four more on completions.

The company has increased its production steadily with completion of a pipeline. Average production during July 1960 was 23,710 b/d, with cumulative production as of 31 July, 1960 of 3,705,309 barrels. The pipeline was completed March, 1960. It has 12¾ inches diameter from Anticlinal Grande to Cerro Dragon and 14 inches from Cero Dragon to Caleta Cordova. Total length is 80 miles, initial capacity 50,000 b/d.

The company is operating one seismic crew full time in the contract area and has one surface party in the field.

Wells average 5,785 feet in depth. All are on the pump, or go on pumps in a short time. There is no field stabilization H_2S removal problem.

White Eagle Operations: White Eagle International Inc., signed a 20-year agreement in 1960 to initiate secondary recovery in the Argentine oil properties of Astra Cia. Argentine de Petroles S. A. The contract covers 14,005 acres in the Comodoro Rivadavia area which has produced since 1917. White Eagle has completed its engineering study and is ready to begin an experimental pilot flood.

ESSO SAPA Operations: Under its contract with YPF, Esso carried out delimitation of its contract area in 1959, along with an aerial photographic survey. The program for 1960 included the drilling of 12 exploratory wells using two company rigs the whole year. The 1960 budget covers continuation of the drilling and exploration work, additional facilities at Huincul camp and the purchase of miscellaneous drilling equipment and transportation units. Total expenditures for 1958 and the first semester of 1960 amount to approximately 8,600,000 dollars.

Two Continental-Emeco drilling rigs, one A-800 and one GC-500 and accessory equipment were purchased during February 1959 and have been in operation since the middle of that year.

Challaco-Puerto Rosales Pipe Line: In accordance with the terms of the basic agreement between Esso and YPF signed in December 1958, Esso is financing and constructing a pipeline from Challaco to Puerto Rosales to transport the crude oil produced in the area to seaport.

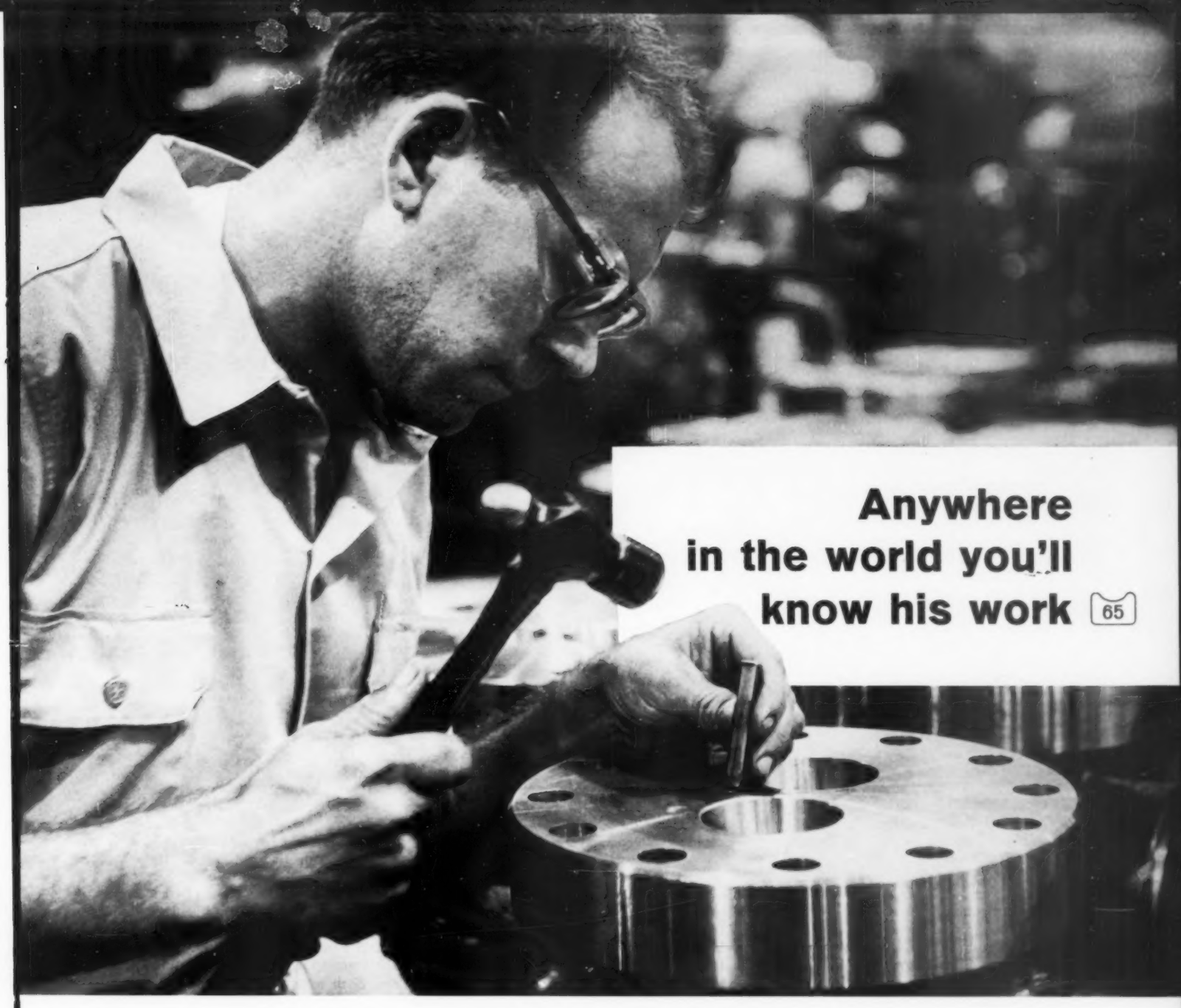
The Argentine contract began work on the pipeline on September 15, 1960, clearing right of way, ditching and stringing the pipe, all of which is stored at railroad sidings between Bahia Blanca and Challaco. Main line construction will be completed in September, 1961. Construction of the pumping station at Challaco is scheduled to start in January 1961 with completion in November, 1961. The start-up of operations of the overall project is scheduled to begin in November, 1961.

Southeastern Drilling Co. Operations: Under its large drilling contract with YPF, Southeastern Drilling Co., of Argentina, S. A., subsidiary of Southeastern Drilling Co., twenty to twenty-five miles southwest of a little town by the name of Caleta Oliva, on the Atlantic Coast approximately 70 miles south of the town of Comodoro Rivadavia. The work area is within the limits of and adjacent to the YPF-names oil field of Canadon Leon.

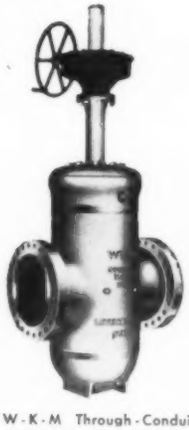
At the end of the first contract year, the end of August, 1960, Southeastern had drilled 79 wells of the total of 1,000 contracted to be drilled. Of course during the first contract year, final plans for the design of the rigs, camps and other equipment had to be finished, all of the equipment had to be ordered, accumulated and shipped. Upon arrival of the equipment in Argentina, it had to be transported to the work area from Puerto Dessado and set up. Two drilling rigs and two completion rigs were first shipped and put into operation. Drilling was first started around the first of February, 1960. Additional drilling and completion rigs were added and put into operation so that at the beginning of the second contract year, a total of six drilling rigs and four completion rigs were on hand and all working.

During the months of September and October 1960, with these six drilling rigs, a total of 44 wells were drilled with the depths varying

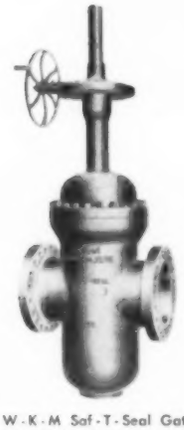
(*) For a detailed breakdown of all rigs operating in Argentina reference is made to International Rig Report, a monthly report on drilling rigs active. It breaks down each rig in Argentina, showing type and make of rig, contractor, and operating company. Information on this reporting service is available through Petroleum Legislation, Post Office Box 1591, Grand Central Station, New York 17, New York.



...one reason why W-K-M Valves are the standard of dependability



W-K-M Through-Conduit Gate Valves (ASA) Catalog 300



W-K-M Saf-T-Seal Gate Valves (ASA), Bulletin WS-1061

W-K-M Through-Conduit Gate Valves for Oilfield Service, Catalog 200

Every important part of W-K-M valves carries the mark of the craftsman who made it. This seal denotes personal responsibility and pride of workmanship that give you greater assurance of trouble-free service.

An unusual degree of individual responsibility today? Yes. But it's one reason why W-K-M valves by tens of thousands have dependably harnessed the complete range of wellhead pressures—including the world's highest. And one reason why W-K-M pipeline valves outnumber any other valve in mainline service.

World-wide sources include: ACF (Great Britain) Ltd., London, England; W-K-M Canada (Ltd.), Calgary and Edmonton, Canada; Hubner & Mayer, Gesellschaft, m.B.H., Vienna, Austria; Breda Fuccine, S.p.A., Milano, Italy; Fabrica de Implementos para la Industria Petrolera, S.A., Mexico D.F., Mexico.

W-K-M

DIVISION OF ACF INDUSTRIES
INCORPORATED
P. O. BOX 2117, HOUSTON, TEXAS

between 1,400 meters and 1,800 meters.

Saipem Operations: Argentina has doubled the number of wells to be drilled and completed under a contract with Saipem, subsidiary of Italy's ENI. The revised agreement with Saipem increases the number of wells in the program from 300 to 600. The work will be carried out on the southern flank of Comodoro Rivadavia field.

PRODUCTION: Oil production during 1960 rose about 35% over 1959. Both YPF and private company production increased, with the most striking rise shown by two private contractors to YPF, Pan American and Loeb Rhoades who provided together approximately 60% of the national increase.

Assuming a probable monthly average of 589,050 bbls. during the last four months of 1960, crude production should be nearly 172,603 b/d. 1960's consumption of gas is expected to exceed twice that of 1959, which averaged 17,830 b/d petroleum equivalent.

Production Fields: There are five principal producing fields in Argentina consisting of Chubut, Santa Cruz, Salta, Neuquén (Plaza Huincul), and Mendoza. Producing fields within these major areas are as follows:

Chubut Fields: Central Zone, Cañadón Perdido, Caleta Córdova, Restinga Alí, Escalante, Manantiales Behr, El Trébol, El Tordillo, Cerro Dragón, Pampa del Castillo, Zona de Sermiento and Punnta Piedras.

Santa Cruz Fields: Cañadón Seco, Meseta Espinosa, Cañadón León, Pico Truncado and Tres Lagunas.

Salta Fields: Tranquitas, Campo Durán, Madrejones and Ex Esso.

Neuquén (Plaza Huincul) Fields: Central, Cutralcó, Challacó, Del Medio, El Sauce, Aguada Quinchao, Cerro Bandera, Cerro Lotena, San Martin, Barda González, Puesto López, Anticlinal Campamento and N.I.

Mendoza Fields: Tupungato, Tupungato Refugio, Piedras Coloradas, Barrancas, Lunlunta, La Ventana, Estructura Intermedia, Rio Tunuyán and Lunlunta Carrizal.

Reserves: YPF estimates Argentina proved recoverable reserves of crude oil at 477,600,000 cubic meters, about 3.008 billion barrels. This estimate is believed to be high, and private sources place Argentine reserves at 1.5 billion barrels maximum crude proved recoverable reserves, down to about 1.05 billion barrels minimum. There will be some increases shortly due to the discoveries by Tennessee Argentina in the Tierra del Fuega area.

REFINING: There are 16 refineries operating in Argentina with a crude capacity of 250,330 b/d. Catalytic cracking capacity is 16,000 b/d, thermal cracking capacity is 73,900 b/d and special processing units are designed to process 50,900 b/d of intermediates.

Two principal expansion programs are in progress under contract with Kellogg Pan American Corp., Buenos Aires. At Lujan de Cuyo YPF is adding 28,000 b/d of new crude capacity, a delayed coker and a fluid catalytic cracker.

Esso is building a fluid catalytic cracking unit at Campana (near Buenos Aires). Tecno-Astar, a local firm, is working with Kellogg and Esso engineers on the project.

Still in the formulative stages are new refineries and expansion by YPF. For other expansion programs see following pages.

Effective operating capacity of present plants is roughly 225,000 barrels per calendar day which compares with a national consumption of about 285,000 b/d of products in 1959. Argentina must more than double its present still capacity during the next five years if self-sufficiency is to be attained. Plants now operating or projected will leave a gap of 170,000 b/d.

MARKETING: YPF estimates the national demand at 15,680,000 cubic meters during 1960 (about 270,211 barrels daily) and 1961 demand at 17,700,000 cubic meters (about 305,022 barrels daily).

TRANSPORTATION: Two crude pipelines and one natural gas line were completed in Argentina during 1960, a record year. Principal lines completed were the twin pipelines built from the extreme north of the country down to Buenos Aires, the largest pipeline project ever completed in South America. The 1100-mile, 22 and 24-inch gas pipeline and the 900-mile 12-inch products line were built together as one project. Supply for both comes from the Madrejones and Campo Durán fields, gathered in a dual pipeline system and processed in a single gasoline plant. The liquid pipeline is really a products line, taking seven finished products for delivery to markets along the line and to the terminal in San Lorenzo, where large quantities of stabilized distillate are also shipped for further processing. Capacity is 57,860 b/d of liquid products, plus 243 million cubic feet of gas per day. The pipelines were built for YPF by International Pipeline Constructors, with Fish Engineering Corp. handling engineering and construction supervision. Purchasing and financing of the line were extremely complicated.

Second project completed was the crude line built by Pan American for its operation in Comodoro Rivadavia. For a description see that section under Exploration. Esso also signed a contract on 16 May 1960 to construct a pipeline for crude oil from Challaco in Neuquen Province to Puerto Rosales in Buenos Aires Province. See the Esso section under Exploration for further details. The construction of the line was specified in Art. 15 of Esso's production contract with YPF of 3 December 1958.

YPF is seeking bids for construction, finance, and operation of a $300-million, 1000-mile 30-in. natural-gas line from Comodoro Rivadavia to Buenos Aires, initially delivering 350 million cubic feet daily from Patagonia to the Buenos Aires area. Compressor stations with a combined total of 200,000 hp. are planned for the first stage. Throughput will be stepped up to 525 million feet later. The government is looking for a builder willing to serve as operator for the system. The builder-operator would receive a toll on every cubic meter of gas transmitted for an indefinite period.

ARGENTINE PETROLEUM PRODUCTION
January-August, 1960
(in Cubic meters)

Y.P.F. AND CONTRACTORS	
Comodoro Rivadavia	2,215,304
Pan American (Chubut and Santa Cruz)	558,529
Plaza Huincul	654,857
Northern Zone (Salta)	632,085
Carl M. Loeb (Mendoza)	526,625
Mendoza	1,060-446
Tennessee (Tierra del Fuego)	34,674
PRIVATE COMPANIES	
Shell (C. Rivadavia)	258,724
Astra (do)	52,429
Petroquimica (C. Rivadavia)	54,100
Esso (Plaza Huincul)	8,178
El Sosneado (Mendoza)	488
	6,056,439
	(38,155,566 bbls.)

ARGENTINE TRADE IN PETROLEUM—1955-1959

	Bbls/Day
Imports of Crude Oil	
1955	79,637
1956	81,899
1957	115,422
1958	130,195
1959	102,426
Imports of Products	
1955	64,630
1956	74,877
1957	55,080
1958	47,980
1959	48,386

PRODUCTION OF NATURAL GAS IN ARGENTINA

	Cubic Feet
1955	37,384,003,000
1956	40,527,229,000
1957	49,938,545,000
1958	58,399,103,000
1959 (1)	72,620,000,000

(1) Provisional figures.

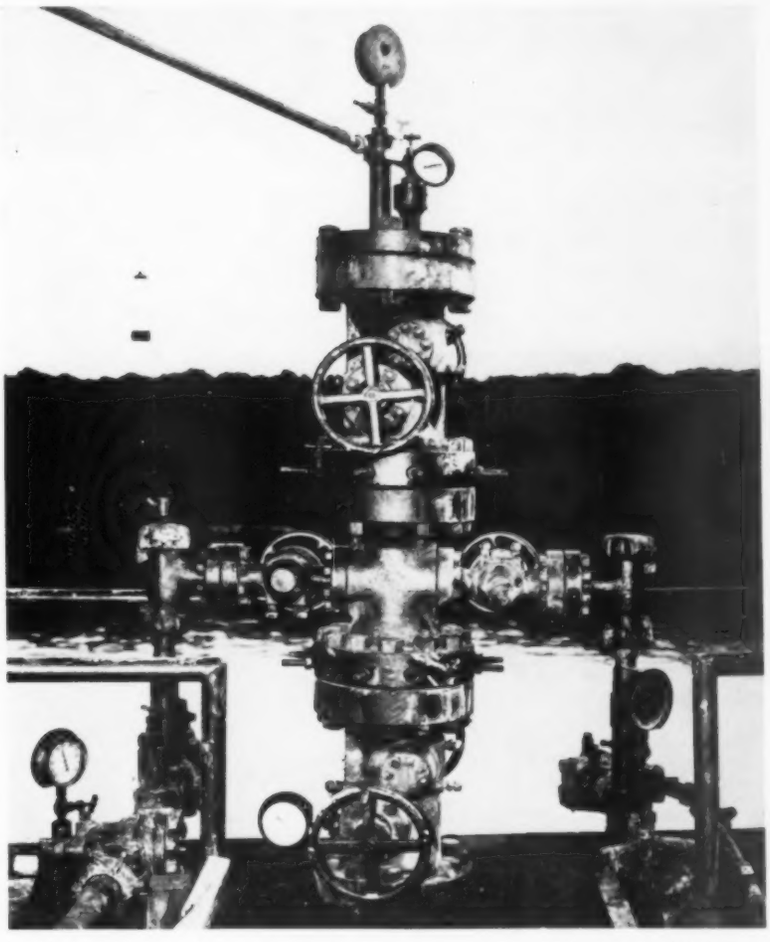
OIL LAWS

The new oil policy of Argentina began in 1958 when the government revised its oil law structure with Law 14,773 of 12 November 1958. It placed control of resources in the hands of YPF, and a series of important production contracts were concluded then and are still being negotiated with later arrivals. See World Petroleum Report 1959 for the L & R Development, Union Oil, Pan American, Esso, and Shell contracts. See the 1960 edition for the Tennessee, SAIPEM, and Kerr-McGee contracts. For a detailed study of the Argentina oil legal situation reference is made to Petroleum Legislation, an international legislative reference service which reviews every country in the world. Information can be obtained from the publisher, Petroleum Legislation Ltd., Post Office Box 1591, Grand Central Station, New York 17, New York.

PRODUCTION FORECASTS FOR ARGENTINA 1960-1964
(YPF Figures—Thousands of Cubic Meters*)

YPF WELLS	1960	1961	1962	1963	1964
C. Rivadavia (F.N.)	1,101	1,037	979	931	888
C. Rivadavia (F.S.)	2,335	3,610	4,300	4,830	5,320
Mendoza	1,582	1,604	1,684	1,754	1,814
Plaza Huincul	995	1,022	1,045	1,065	1,085
Salta	1,286	2,000	2,000	1,900	1,800
Total by YPF	7,299	9,273	10,008	10,480	10,907
Drilling by Contractors for YPF					
C. Rivadavia (F.S.)	495	2,132	3,840	5,480	7,040
Total by YPF	7,794	11,405	13,848	15,960	17,947
CONTRACT AREA DRILLING					
Mendoza (Banco Loeb)	905	1,400	1,660	1,410	1,240
C. Rivadavia (F.N.) Pan American	1,368	1,800	2,000	2,000	2,000
Tierra del Fuego (Tennessee)	80	150	200	200	200
Total by contract	2,353	3,350	3,800	3,610	3,440
Total YPF	10,147	14,755	17,708	19,570	21,387

*One cubic meter is equivalent to 6.29 U.S. barrels.



The world's first Dual Completion utilising two independently run and suspended strings of tubing. It has a working pressure of 5,000 p.s.i.

From an untretouched photograph

NEWMAN, HENDER

Multiple Completions

with Newman-McEvoy Automatic Self-sealing conduit gate valves

Newman-McEvoy Multiple Completion Well Heads and Christmas Trees enable oil engineers to produce from two or more oil zones simultaneously. They give a far higher output on the probable life of the casing. Two, three, four or five independently suspended tubings can be operated from the same well bore.

Newman-McEvoy Multiple Completions, Well Heads and Christmas Trees are all controlled with Newman-McEvoy Automatic self-sealing valves. They provide a tight, positive seal-off between the tubing strings. Absolutely reliable and easy to operate.

N.H. technicians are always available to advise on the best equipment for any particular purpose or application. Do not hesitate to make use of them.

NEWMAN, HENDER & Co., Ltd.

Telegrams: Valves, Telex, Stroud **Woodchester,** Stroud, Glos., England *Telex 43755*

The SAIPEM contract was extended during 1960 to cover 600 wells instead of the original 300. The Kerr-McGee and Southeastern contracts were lengthened and the drilling payment commitments thereby reduced.

Argentina's oil industry was launched into its second stage during early November 1960 with promulgation of a decree opening the famed "Flanco Sud" or southern flank of the Comodoro Rivadavia oil area—far to the south of the country to development by private companies, both national and international. This area, formerly the exclusive hunting ground of the government's YPF, and also the chief source of its oil production, is probably only the first step in opening the entire country to oil bids. The northern part had already been thrown open by previous decision—and new decrees are expected to take care of the remainder.

Entire text of Argentina's oil legislation and contracts has been published in a noteworthy collection, *"South America—Basic Oil Laws and Concession Contracts."* It is a word-for-word compilation of applicable laws, an interesting and useful collection which includes oil regulation for the other countries of South America as well. For information address inquiries directly to its publisher, *Petroleum Legislation Ltd., Post Office Box 1591, Grand Central Station, New York 17, New York.*

ARGENTINA—REFINING AS OF JANUARY 1961

(Figures expressed in barrels per calendar day)

Company	Refinery Location	Crude Distillation	Cat Cracking	Thermal Cracking	Special Processing	Average Crude Runs
Y.P.F.	La Plata (Bs. As.)	100,000	16,000	20,000	30,300	91,400
Y.P.F.	S. Lorenzo (Sta. Fe)	25,000	—	6,000	5,000	21,600
Y.P.F.	Lujan de Cuyo (Mendoza)	14,000	—	2,000	6,300	12,400
Y.P.F.	Dock Sud (Bs. As.)	6,000	—	2,000	2,500	5,300
Y.P.F.	Chachapoyas (Salta)	3,500	—	1,300	—	2,900
Y.P.F.	Plaza Huincul (Neuquen)	2,500	—	500	—	2,200
Esso S.A.P.A.	Campana (Bs. As.)	65,000	16,000	22,000	2,800	35,200
Esso S.A.P.A.	Galvan (Bs. As.)	5,500	—	5,000	—	8,100
Esso S.A.P.A.	M. Elordi (Salta)	1,300	—	—	—	1,100
Esso S.A.P.A.	Dadin (Neuquen)	500	—	—	—	300
Diadema Arg. S.A.	Dock Sud (Bs. As.)	47,000	—	17,000	3,000	37,600
Condor	Avellaneda (Bs. As.)	900	—	—	—	700
La Isaura	Bahia Blanca (Bs. As.)	2,000	—	1,000	—	1,700
Lottero Pepini, S.A.	Pineyro (Bs. As.)	500	—	—	—	600
Ragor S.A.I.C.	Quilmes (Bs. As.)	400	—	—	—	300
Petroquimica	C. Rivadavia (Chubut)	5,500	—	2,000	—	3,900
TOTAL COUNTRY		278,700	32,000	78,800	50,900	225,300

ARGENTINE CONSUMPTION OF PETROLEUM AND GAS 1960-1964

(Millions of Cubic Meters of Oil Equivalent—YPF Estimates)

	1960	1961	1962	1963	1964	Total
Oil Production by YPF	10.1	14.7	17.7	19.6	21.4	83.5
Contract Areas	0.6	0.6	0.5	0.5	0.5	2.7
Gas	1.8	2.5	3.0	3.5	7.1	17.9
Total Production, Gas and Petroleum	12.5	17.8	21.2	23.6	29.0	104.1
Consumption, Gas and Petroleum	17.6	18.6	19.8	21.0	22.2	99.2
Difference between Production and Consumption	—5.1	—0.8	+1.4	+2.6	+6.8	+4.9

NATIONAL FACTORS

Argentina has pursued a campaign of austerity under the Frondizi administration. Finance Minister Alsogaray, an active and outspoken advocate of balanced budgets and plain speech, has pushed the program successfully. Cost of imports has been reduced substantially and the country appears to be on its way up again after having been severely decapitalized during the Peron administration.

The oil policy of Dr. Frondizi has aroused strong opposition on occasions, and demands for the expulsion of Minister Alsogaray. So far none of these demands has succeeded and the government's policy of expansion goes on.

There is some resentment of international investment in the country, and while the oil companies have tried to make themselves inconspicuous they have not succeeded. Higher wages in the oil companies have attracted many technicians away from YPF where wage scales are extremely low and YPF takes a very dim view of this. Also, operations in Argentina are not easy. Merely establishing an office in Buenos Aires is a difficult operation. Curiously, the oil companies seem to have more faith in Argentine materials and work than the Argentines themselves do and the companies have been responsible for use of many local concerns against advice from Argentine counsel.

Three laws were enacted on February 15 and 16, 1960. One of them established a revaluation of assets and two of them contained substantial changes in existing tax laws. Among the provisions of interest to oil operations are: Changes in Income taxation: 1. Rates for Argentine corporations have been raised from 30% to 33%; 2. The rate for Argentina branches of foreign corporations has been raised from 38% to 38.36%, has has the tax rate on fees, technical service, royalties, etc. remitted or credited to beneficiaries abroad; 3. Losses may be carried forward 10 consecutive years as from 1956 inclusive. END

A detailed study of taxation of petroleum in Argentina has been prepared and will be available during early 1961 under the title of *"International Taxation Series."* This series is devoted exclusively to petroleum taxation, covering every type of tax imposed on petroleum operations in Argentina and all countries. Marketing, refining, transportation, exploration and production taxes are covered, with a separate study of each. For an example of one of these national studies (all are prepared in exactly the same format) readers are referred to the Colombia section of this issue of World Petroleum Report, that section entitled "Colombia—Petroleum Industry Taxation." Requests for information should be addressed to *"International Taxation Series", Post Office Box 1591, Grand Central Station, New York 17, New York.*

PARAGUAY

EXPLORATION: No activity in exploration was reported during 1960. The Pure Oil Co., which suspended operations in 1959, retains an interest in three million acres of the original 14-million-acre concession, but has no immediate plans for further drilling. Partners in the venture include Gulf Oil, Sinclair, Tidewater, and Williams Bros. Acreage being retained for possible future exploration is situated in the northwest Chaco territory, near the Bolivian border.

A concession granted in 1958 to the Brazilian firm, Petroleo Guarani SA (a subsidiary of Fiduciaria Fluminense, Rio de Janeiro) has been extended for a period of 16½ months from the end of October 1959. The company reportedly has carried out an aerial survey of part of the area.

REFINING: A 1958 offer by Esso to build a refinery near Asuncion was withdrawn during 1960. There is no refining in Paraguay at present.

TRANSPORTATION AND MARKETING: There are no crude pipelines in the country, since there is no production of oil. A project for a pipeline from Bolivia evidently has been abandoned.

Marketing needs in the country are small, estimated at around 1,600 b/d.

OIL LAWS

No change occurred in Paraguay's oil laws as contained in *World Petroleum Report 1959.* A draft of a new oil law has been drawn up, but it had not been promulgated as of the end of 1960.

Complete text of Paraguay's present oil legislation has been published in a recommended and noteworthy collection: *"South America—Basic Oil Laws and Concession Contracts."* It is a word-for-word compilation of applicable laws, an interesting and useful collection which includes oil regulation for the other countries of South America as well. For information, address the publisher directly: *Petroleum Legislation Ltd., P. O. Box 1591, Grand Central Station, New York 17, N. Y.*

NATIONAL FACTORS

For a review of the factors affecting investment, see *World Petroleum Report 1959* and *1960.* During December 1959, a revolt occurred, and an invasion by student groups was sternly repressed by the president, Alfredo Stroessner. Business operations in the country were not interrupted. Union Oil, which explored for many years in the Chaco region, stated political disorders never seriously affected its operations. END

BRITISH GUIANA

California Oil Co. (British Guiana) Ltd., continues to hold its exploratory licenses. The company is a subsidiary of California Exploration Co., an affiliate of Standard Oil Co. of California. For a review of the country's short oil history and of its oil legislation see *World Petroleum Report 1960,* the review there being quite complete.

A concession is also held by McBride Oil and Gas Corporation, San Antonio, Texas (4000 sq miles offshore).

OIL LAWS

Entire text of British Guiana's oil legislation has been published in a noteworthy collection, *"South America—Basic Oil Laws and Concession Contracts."* It is a word-for-word compilation of applicable laws, an interesting and useful collection which includes oil regulation for the other countries of South America as well. For information address inquiries directly to its publisher, *Petroleum Legislation Ltd., Post Office Box 1591, Grand Central Station, New York 17, New York.*

BOLIVIA

*Summary:** Exploration activity in Bolivia in 1960 was about at the same level as 1959 with two more exploration rigs added. Highlight of the year is Gulf's Caranda—1 and 2 wells which found some 300 and 450 b/d of 50° API oil in the lower Gondwana at 5,850 ft. This is the first discovery in central Bolivia, outside the productive belt of YPFB's small fields in the southern subandean zone.

Aside from the government-owned YPFB, 15 private oil companies hold 11,309,102 hectares (one hectare equals approx. 2.47 acres) of concessions. Of these companies nine were actively exploring in 1960, totalling 102 party months of geological fieldwork, seven gravity and 59 seismic prospection. 42,000 square kilometers of aerial photography were flown and seven exploration rigs drilled 12 wildcat wells with a total footage of approximately 77,512 feet. Furthermore, seven deep and 14 shallow structure holes were drilled. Four wells were drilling at year's end.

Bolivian Oil Co.'s Madrejones field started limited production, the bulk still produced by YPFB. Average daily output for Bolivia in 1960 was 10,215 barrels.

Transportation and refinery capacity remained practically unchanged.

An account of activity is given for each company holding permits in Bolivia:

Yacimientos Petroliferos Fiscales Bolivianos, a fully state-owned entity, controls over 11 million hectares in the southeastern part of the country. Parts of the area are leased by special contract to three private oil companies (Gulf, Chaco and Bolivian Oil). On the remainder, YPFB was active with three geological parties (18 party months, field-work) one gravity (17 party months) and two seismic parties (24 party months).

With two rigs, two exploration wells were completed in 1960 and two are still drilling.

DRILLING BY YPFB (1960)

Capirenda—1	1959-60	TD 10,410'	Dry
Caranda-ti—3	1959-60	TD 16,143'	Dry [deepest hole in Bolivia]
La Vertiente—1	1960		Drilling
Sipuati	1960		Drilling

In the Camiri field, YPFB's main producer, a deeper Devonian horizon, called "Areniscas 16" was found, which is expected to boost the output of the field considerably. Several development and outstep wells in the existing small oil fields were drilled which, however, did not add significantly to the overall production.

Cia. Petrolera Boliviana Shell (Royal Dutch-Shell Group) relinquished its concessions in zone III. Concessions in zone I were partially relinquished and Shell now holds 1,748,624 hectares, pooled 50-50 with Bolivia California Petr. Co. Two geological field parties were active (24 party months) no gravity, but one seismic party (12 months) and 42,000 sq. km. of aerial photography were flown in zone II. Shell/Bolivical entered a deal with Bolivian Petroleum Corp. and Bolivian Atlantic Corp. (which holds 80% interest in the former's concessions) for an option of 50% in part of Bolpecor's acreage. Shell/Bolivical spudded a first well, of which Bolivical is designated drilling operator.

DRILLING BY BOLIVICAL (1960)

Santa Rosa—1	1960	drilling

Bolivian Gulf Oil Company (80% Gulf Oil Corp., 7% Falcon Seaboard Drill. Co.; 7% Barry and Reines Inc.; 6% William Bros.) holds 1,696,054 hectares of concessions in zones I and II and 1,500,000 hectares under special contract with YPFB. Three geological field parties (±28 party months), one gravity (six party months) and two seismic parties (20 party months) were active. In the northern part of the contract area, Gulf continued an extensive structure drilling campaign resulting in seven deeper structure holes (approximately 3-5,000 feet) called Izozog 1-7 and 14 shallow holes drilled with a Davies waterhole rig. (Average depth 600-1,000 ft.).

The following exploration deep tests were completed or started in 1960:

DRILLING BY BOLIVIAN GULF (1960)

Mataiguá—1	1959-60	TD	12,010'	Dry
Victoria—1	1959-60	TD	7,236'	Dry
Victoria—2	1959-60	TD	7,009'	Dry
Boyuibe—1	1960	TD	12,784'	Dry
Mandeyapecua—3	1960	TD	6,285'	Dry
[All above wells in YPFB contract zone.]				
Caranda—1	1960	TD	13,031'	Discovery well, tested ±300 b/d 50° oil in Lower Gondwana.
Caranda—2	1960		8,243'	Tested 450 b/d but more horizons to be tested.
[Above two wells in zone I.]				

The Caranda structure, mainly defined by seismic, is situated about 35 kilometers northwest of Santa Cruz de la Sierra.

Andes Oil Company (one third each: Pure Oil—operator; Hancock Oil Co.; Standard Oil Co. of Ohio) holds 475,586 hectares in zone I. A deal is presently being worked out, where Gulf will have an option on part of Andes concessions by drilling an exploration well. Andes completed seismic prospection late in 1959 and was not active during 1960.

Chaco Petroleum Co. (35% Tennessee Gas Transmission Co.—operator; rest owned by Monsanto Chemical Co. through Lion Oil Co.; Murphy Oil Corp.; Union Oil & Gas Corp. of Louisiana) has a contract for exploration and exploitation in the southern part of the YPFB area, succeeding the former McCarthy Co. The area was reduced for a second time and now comprises 179,829 hectares. Geological fieldwork was completed in 1960 (two parties, 16 party months) and one seismic party worked for seven months. Exploration drilling with one rig completed and started three wells in 1960:

DRILLING BY TENNESSEE GAS—1960

Agua Salada—2	1958-60	TD 14,955'	Dry
Palo Marcado—1	1960	TD 11,982'	Dry
Palo Marcado—2	1960		Drilling

Bolivian American Oil Co. (subsidy of Consolidated Cuban Petr. Co.-Oriental Exporters Inc.) holds or has applied for a total of 1,122,350 hectares in zones I-II-III but did no prospection during 1960.

Bolivian Petroleum Corp. (20% Drilling Explor. Co. Inc. of Dallas, 80% Bolivia Atlantic Corp.) holds 499,999 hectares in zone I. Shell/Bolivical has an option on part of this acreage for a 50% undivided interest and are presently drilling a first well on this issue: Santa Rosa—1 (see above). Bolpecor did one month each of gravity and seismic work in 1960.

Cataract Mining Corp. (subsidy of Cataract Mining Corp. of Arizona, recently merged with Alasca Oil Co.) covers 114,750 hectares in zone I and has not done any exploration yet.

White Eagle International Oil Co. (owned by White Eagle Oil Co.—100% Helmrick & Payne; Western Hemisphere Petroleum Corp.; Blackwell Oil & Gas Co.) has 900,000 hectares concessions in zones I & II. Bolivia Atlantic Corp. has an option on part of this acreage. Prospecting by both companies amounted to three months of seismic work.

Bolivia California Petroleum Co. (Standard Oil of California) has partially relinquished some acreage in zone I and now retains 1,904,637 hectares in zones I & II, all wholly pooled with Shell. Exploration activity included two geological field parties with 24 party months and one seismic party (11 party months). The company is designated operator for drilling and started the first joint venture well Santa Rosa—1 on Bolpecor's acreage (see above). Earlier in the year, two shallow structure holes were drilled in zone II, totalling 4,114 ft.

Bolivian Oil Co. (Fish Eng. Corp. Houston; North American Utility & Construction International Co.; Petroleum Machine & Service Co.; Tipsa S.R.L.) holds a special contract over 43,800 hectares within the YPFB area for exploitation of the Bolivian portion of the Madrejones field (Argentina, YPF). After finding oil in Madrejones MB-1 in 1959, the company continued drilling with two rigs and sunk four more wells in 1960 which are considered development wells. An outlet to Argentina was completed and the company started exportation of oil to Argentina. YPFB likewise is exporting most of its royalty oil from Madrejones.

Bolivian Texas Co. S.A. (subsidy of Texas National Gasoline Corp.) relinquished the total of its 499,997 hectares concessions without having done any exploration work.

Bolivian Atlantic Corp. (Atlantic Refinery Corp.) has an interest in Bolivia Petroleum

*Review by Mr. L. E. Schlatter, Cia. Petrolera Boliviana Shell, La Paz, Bolivia.

Corp. and options on White Eagle International Oil Co. acreage (see above). The company requested 100,000 hectares of new concessions in zone I but withdrew the application before being granted. Some prospection was carried out in White Eagle and Bolpecor's acreage.

Brazilian Treaty Area: Four private Brazilian companies applied for and were granted concessions in 1959 in the former Brazilian treaty area, called zone "B" to the north of YPFB's oilfield belt.

Cia. Uniao Brazil De Petroleo (subsidy of Refineria e Exploracao de Petroleo "Uniao" S.A.) covers 269,341 hectares in zone B. After some five months of geological fieldwork the company spudded in October their first exploration well (Kerr-McGee is the contractor for administrative and technical services).

DRILLING BY CIA. UNIAO—1960

Don Bosco—1	1960	Drilling

Petroleo De Bolivia S.A. has not yet started any exploration activity on their 217,201 hectares of concessions in zone B.

Cia. Petrolera Andina S.A. (backed by Fiduciaria Fluminense S.A.) holds 332,931 hectares in zone B. Exploration has not yet started because of an undissolved border dispute with YPFB.

Cia. Petrolera Brazileira S.A. (related to Enchimica S.A.) has 304,000 hectares in zone B. About five months each of geological and seismic prospection were carried out and presently a first exploration well is being prepared at Tatarenda.

PRODUCTION: Production by YPFB is decreasing. In 1959 it declined 7.73% to 8,658 b/d and to 8,215 b/d at the end of 1960.

Bolivian Oil's Madrejones field started production in the course of the year, producing 2,000 b/d in November but is declining.

Reserves: Bolivian reserves are estimated by YPFB (as of 18 October 1960) as follows:

	Barrels
Proved Oil Reserves	33,125,000
Recoverable Oil Reserves	43,062,000

TRANSPORTATION: The pipeline net of Bolivia, currently 1829 kilometers in length, did not change during the year when Bolivian Oil Co. built a short outlet to Argentina. None of the planned pipelines via Paraguay have materialized.

REFINING: Refining capacity remained unchanged in 1960 at 12,400 b/d. Average throughput reached approximately 6,700 b/d. The major plant is still Cochabamba, capable of 6,000 b/d. Discussions are continuing to transfer part of the sometimes idle Sucre refinery to Santa Cruz, but no work has yet started.

OIL LAWS

The Bolivian Petroleum code remained unchanged in 1960 and there is hope that the prevailing situation, attracting foreign investment, will continue. Efforts to change the code have not been successful thus far.

For an accurate and concise review of Bolivian oil regulation, prepared by counsel within Bolivia, recommendation is made of *Petroleum Legislation,* a legislative reference work for oil that is contained in several volumes and also covers all other countries of the world. Its oil legal reviews are compiled by law firms within the country concerned that have been recommended by oil companies operating there. The same firms keep their reviews up to date by loose-leaf revision service. Cost of Petroleum Legislation is $190, covering the world and including the first year's revision service. Subsequent annual revision maintenance is about half the original cost. Inquiries should be addressed to the publisher directly as follows: *Petroleum Legislation, Ltd., Post Office Box 1591, Grand Central Station, New York 17, New York.*

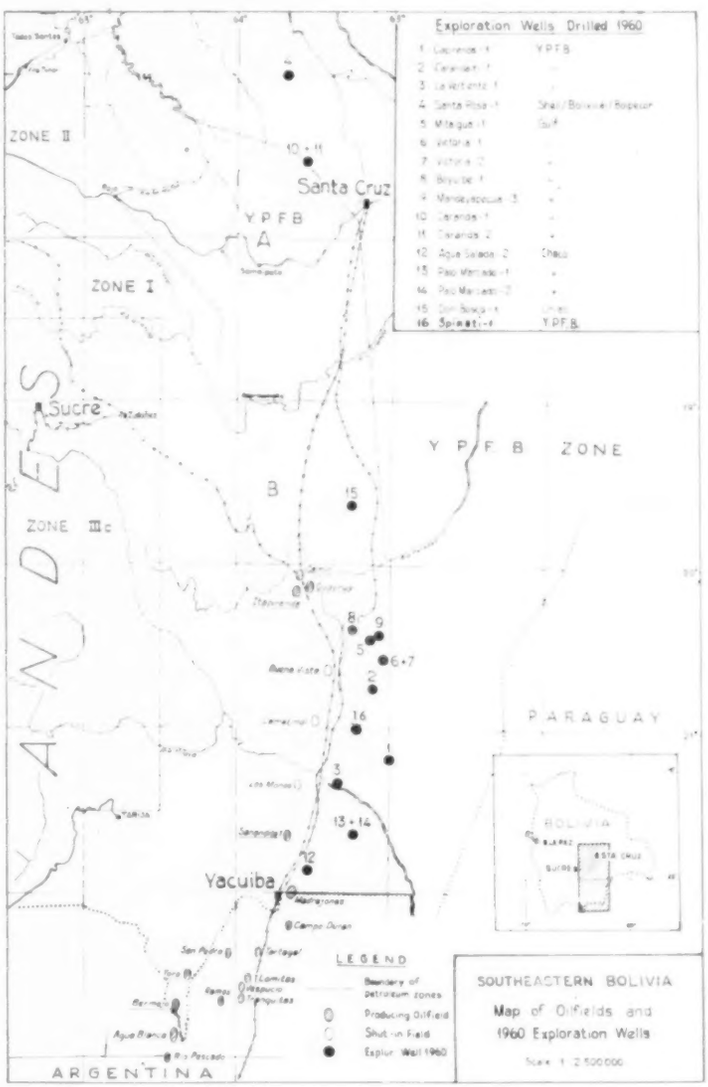
NATIONAL FACTORS

Elections in summer 1960 confirmed the large majority of the leading party M. R. N. (Movimiento Revoluncionario National). The new president is Victor Pas Estensoro (already president in 1952-56), the new vice-president is Juan Lechin, leader of the leftist miners labor union.

The United States has granted YPFB state oil company, a $2.7 million Point Four credit in mid-1960, for the purchase of U. S. oil equipment. It has also agreed to finance a $25,000 study of YPFB's organization, operations and prospects. YPFB has for some time been seriously hampered by foreign exchange difficulties and a shortage of capital.

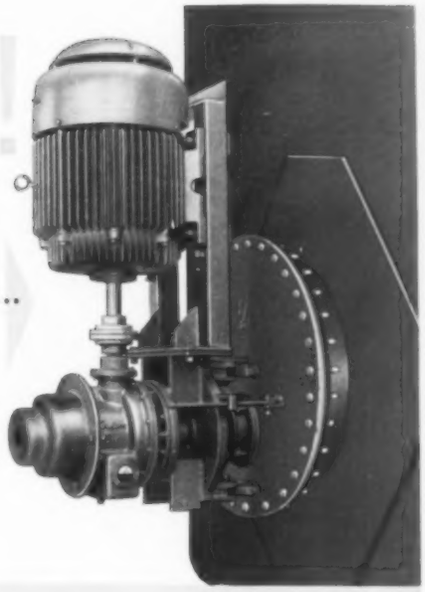
During 1960 (December) the Soviet government offered a loan of US $150 million to develop Bolivia's petroleum and mining industries. The loan would be used by Comibol, the state mining organization, for equipment, and by YPFB for equipment and development.

A detailed study of taxation of petroleum in Bolivia has been prepared and will be available during early 1961 under the title of "International Taxation Series." This series is devoted exclusively to petroleum taxation, covering every type of tax imposed on petroleum operations in all countries. Marketing, refining, transportation, exploration and production taxes are covered, with a separate study of each. For an example of one of these national studies (all are prepared in exactly the same format) readers are referred to the Columbia section of this issue of World Petroleum Report, that section entitled "Columbia—Petroleum Industry Taxation." Requests for information on the entire series should be addressed to *"International Taxation Series," Post Office Box 1591, Grand Central Station, New York 17, New York.* END



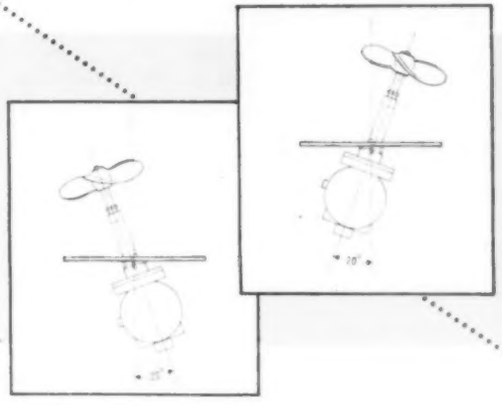
BOTTOMS UP!

JENSEN Mixers provide a method of sweeping crude tank bottoms, thoroughly and economically, regardless of tank conditions, size, or location.



ELECTRIC-POWERED VARI-ANGLE MIXER

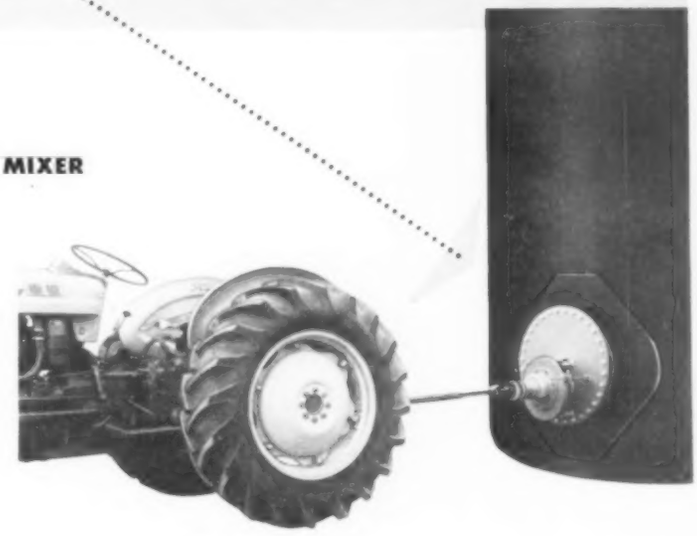
- Light Weight
- Compact with little overhang
- Electric powered for 500 to 200,000 barrel tanks
- Jensen Vari-Angle feature



Jensen Vari-Angle Mixer is adjustable, even during operation. The mixer produces a directed flow stream by varying the angle of the mixer 20° on either side or a total sweeping action of 40°. This complete sweep prevents bottom settling and removes accumulated deposits—HENCE BOTTOMS UP.

DIESEL-POWERED VARI-ANGLE MIXER

- Standard Tractor
- Standard Tractor PTO
- Diesel powered for 500 to 200,000 barrel tanks
- Jensen Vari-Angle feature



Write for complete information

Jensen ENGINEERING COMPANY

5354 SOUTH GARNETT ROAD / P. O. BOX 4507 / TULSA, OKLAHOMA

BRAZIL

Petrobras, as the Brazilian government's Petroleos Brazileiros is commonly known, is in its seventh year of operation. In 1954, the company hired an American geologist, Walter Link, to head its exploration effort. Mr. Link's tour of duty was originally five years, but was extended to six at the request of Petrobras. At the end of 1960, he left Brazil and delivered a final report on the country's oil prospects. The content of this report was published in full in the Brazilian press shortly after it had been delivered to the board of Petrobras. In it, Mr. Link condemned most of the Brazilian sedimentary basins, and his opinion was upheld by the geologists on his staff in an independent rating (see the table of ratings headed "*Final Basin Ratings by Petrobras Geologists*"). This final report by Mr. Link is considered an authoritative and important summation of the world's largest exploration campaign by a single company in a single country. Unfortunately for Brazil, it condemns all but two of Brazil's sedimentary basins, and undoubtedly means the country may never discover the reserves of oil needed to support its growing industry.

Link Reports: In his report of August 22, 1960, Mr. Link had this to say, following his description of the basin ratings contained in accompanying tables.

"On this basis, we find that the Sergipe Land area has a B+ rating and full-scale exploration should continue. The Middle Amazon has a C+ rating and exploration should continue on a reduced rate. Barreirinhas, Maranhao, Alagoas Land, and South Brazil are either straight C or lower, but higher than "D." The oil possibilities cannot be considered favorable and the chances of finding the Bonanza Oil that Brazil needs are very poor. The lower Amazon, Upper Amazon, Acre, Sao Luiz, and Espirito Santo Land, all are D+ or lower and exploration should be discontinued."

"I doubt that any commercial oil company would continue exploration in these Paleozoic basins, or that they would take up lands and begin an exploration project if they knew the geology and exploration results as intimately as we do. My recommendation and advice is to discontinue exploration in the Paleozoic basins at the end of this year. If, however, Petrobras wishes to remain in large-scale oil exploration on a competitive basis with the world oil industry, and has the money to do so, I suggest Petrobras go to some country where concessions can be obtained and where the chances of finding oil are good. The company should not enter any area unless it has an 'A' to 'B+' rating."

PRODUCTION: Crude production, which rose progressively from 2,719 b/d in 1954 to 64,630 in 1959, reached 93,062 early in October 1960. The target fixed for 1960 was raised from 60,000 to 100,000 b/d, which corresponds to 45% of Brazil's present requirements. Average production per Bahia well increased from 265.9 b/d in 1959 to 428.4 in the first four months of 1960. The Agua Grande field produced an average of 47,481 b/d in March, followed by the Candeias field with 15,228.

The latest estimate places Bahia's recoverable reserves at 617 million barrels, excluding the newly-discovered fields of Sauipe, San Sebastiao and Ouricanguinhas, not yet calculated. The fields now known and in process of expansion indicate that crude production can not be raised above 110,000 b/d in 1961.

Until Brazil's refineries are equipped to process Bahia crude with its high paraffin content, national wells can only supply about 37% of local requirements, Petrobras making up the deficiency by importing. In 1959 some 22,570,605 bbls. were acquired abroad at a cost of

BRAZIL—Final Basin Ratings by Petrobras Geologists

	McCreight	Bowman	Fr. Gomez-blange	Sanford	Blan-kenn	Fer-nandes	Link	Average	Excluding Link Rating
Lower Amazon	C	D	D	D	D	D	D	3.85 D	3.83
Middle Amazon	C+	B—	C	C	C	B	C	2.8 C+	2.88
Upper Amazon	C	C	D	D+	D	C	D	3.5 C—	3.4
Acre	C	C	D	D	D	D	D+	3.1 D+	3.68
D. Luiz Maranhao	C—		C—	D	D	D	D	3.6 D+	3.3
Barreirinhas Maranhao	C+		C	C	C	C	D	3.1 C	3.9
Maranhao Sergipe	C		C—	C	C	C	D	3.2 C	3.04
Land			B+	B	B	B	C+	1.9 B+	1.92
Alagoas Land			C+	D	C	D	D+	3.4 C	3.30
Esp. Santo South Bahia			D	D	C—	C	D	3.8 D	3.58
South Brazil			C—	C	C	C	D	3.4 C—	3.2

The above ratings were compiled by Petrobras geological staff. They accompanied a report to the board of Petrobras dated 22 August 1960, submitted by Walter Link, former head of the Exploration Section. He defined an "A" basin as one in which there is commercial production, and where exploration should be continued. A "B" basin is one that has all the requisites present and in which geological factors indicate that commercial oil should be found, and warrants continued active exploration. A "C" basin is a marginal basin in which a great deal of exploration has been done and without commercial success. Such basins call for curtailment of exploration and not necessarily cessation entirely. The "D" basin is one that is considered as having no possibilities and exploration should cease. For mathematical averaging A equals 1; B equals 2; C equals 3; and D equals 4.

US $64,253,605.29 C.I.F. Brazil. The average landed price per barrel dropped from US $3.01816 in 1958 to US $2.8467 in 1959.

The value of Bahia crude processed in Brazil and exported in 1959 amounted to US $36,378,000 and US $31,136,000, respectively. Bahia crude is exported under an agreement with Esso Standard Oil, according to which the latter acquires 30,000,000 bbls. for three years, or until the national refineries are equipped to process it.

REFINING: Petrobras estimates Brazil's oil consumption for 1960 at 250,000 b/d. The breakdown in barrels per day is: Avgas, 8,700; motor gasoline, 74,000; kerosine, 11,500; LP-Gas, 11,500; diesel fuel, 58,000; fuel oil, 82,500; lubricants, 3,800.

National refineries are expected to process 218,000 b/d and to become self-sufficient as regards refined products in 1961. Private plants process 58,800 b/d.

The state-owned Presidente Bernardes refinery raised capacity from 100,000 to 120,000 b/d in September and the Landulfo Alves plant at Mataripe is increasing from 35,000 to 52,000. The 90,000 b/d refinery at Duque de Caxias (Rio) is scheduled to start production at 60,000 b/d early in 1961, while Petrobras plans to begin building the Minas Gerais refinery, near Belo Horizonte, within the next few months and the Rio Grande do Sul plant, at Porto Alegre, possibly in 1961.

The initial capacity of the Belo Horizonte plant will be 25,000 b/d, rising later to 45,000. Eleven international companies have submitted tenders for the 298-mile, 12" crude pipeline to connect the refinery to Rio de Janeiro at an estimated cost of 2,200 million cruzeiros.

TRANSPORTATION: Petrobras took delivery of four new tankers of 33,000 tons to 35,000 d.w. during the first eight months of 1960 and of one 10,000 tonner, the first of six ordered in Denmark. This brought the total capacity of the fleet up to 510,000 tons. Two more 10,000 tons vessels were launched at Copenhagen by the end of October and six more were ordered in November—some in Japan, others in Holland.

OIL LAWS

No change occurred in Brazil's oil laws, as outlined in WORLD PETROLEUM REPORT 1957 and subsequent editions.

For an accurate and concise review of Brazil's oil regulation, prepared by legal counsel within Brazil recommendation is made of *Petroleum Legislation*, a legislative reference work for oil that is contained in several volumes and also covers all other countries of the world. Its oil legal reviews are compiled by law firms within Brazil and other countries have been recommended by oil companies operating there. The same firms keep their reviews up to date by loose-leaf revision service. Inquiries should be addressed to the publisher directly as follows: *Petroleum Legislation Ltd., Post Office Box 1591, Grand Central Station, New York 17, New York.*

NATIONAL FACTORS

National sentiment continues in favor of a monopoly of petroleum exploration and development under Petrobras. The new administration is also in favor of the national company, although the example of Argentina has aroused some doubts. The outlook regarding possible reserves of petroleum is becoming less optimistic and the opinion is growing that Brazil must cultivate a Latin American policy of crude production and distribution, based on Venezuela, Colombia, Peru, Bolivia and Mexico, the oil to be paid for by Brazilian products.

Geologically, the country looks less favorable each year. It now appears that the enormous Amazon basin and the other nine principal basins are barren of oil, or almost, and only the small coastal basins are productive. END

COLOMBIA

EXPLORATION: Intense worldwide competition, mounting fiscal levies, increased costs of production, deeper drilling, and developments in the remote interior of the country continued to plague Colombia's oil operations during 1960. Of four completions during the year to October, two were oil discoveries and two were small gassers. Guavio No. 1 was a Texaco dual completion at 10,592 ft in the remote Llanos area 65 miles east of Bogota, where all equipment had to be flown in. Spudded in June 1959 and completed in July 1960, the well's upper zone produced initially 216 b/d of 39 API crude with the lower yielding 338 b/d of 38 API—on a 24/64-in. choke. Guavio No. 1 was the first discovery in the Llanos area, where since 1937 some 20 wells had been drilled without success. North of Guavio No. 1, Shell has spudded Tamé No. 1 near the Barinas-Colombian border.

A successful dual completion by Sinclair during 1960 was its Santos No. 1, said to have a potential of 3,000 b/d. On an Intercol farmout, the well went to 9,964 ft, with the pay zone reported to be 350 ft thick. An upper zone tested initially 144 b/d of 32.4 API crude, and a lower zone 845 b/d of 36.1 API oil, on a ¼-in. choke. On another Intercol farmout nearby, an outpost well was drilling below 5,365 ft.

As of early September 1960, seven operators had 33 rigs in operation—8 exploration, 8 field, and 17 service. Footage drilled during the week ended September 5 totaled 21,066 ft—with 13,872 drilled in the previous week.

Note: For information on drilling rigs active in Colombia, recommendation is made of *International Rig Report*, a monthly airmail service which reports operator, contractor, number and kind of rigs drilling in every country. Information on the service may be obtained directly from: *Petroleum Legislation*, P. O. Box 1591, Grand Central Station, New York 17, N. Y.

As of mid-1960, there was a total of 110 concessions held by oil operators—of which 91 were exploration, and 19 exploitation. From 1931 through 1959, a total of 1,100 concession applications had been filed under Colombia's oil code; but only 339 applications were eligible and, of the eligible, only 252, or 25% of the original 1,110 bids, resulted in the granting of concessions.

PRODUCTION: Crude production in 1960 averaged 155,000 b/d for the year, compared with 146,778 b/d in 1959. For the month of January 1960, production reached a high 156,917 b/d, compared with a high of 155,755 b/d in August of 1959. It dropped to 111,448 b/d in August of 1960 due to a strike in Colpet fields during August and September. Condensate yield currently accounts for average 2,174 b/d and LPGas for 836 b/d.

The number of producing fields in Colombia totaled 27 as of July 1960.

Reserves: Proved recoverable reserves totaled about 700 million barrels as of January 1960.

REFINING-MARKETING: Combined crude throughput capacity of Colombia's five refineries is 71,400 b/d (for details, see *World Petroleum*, July 15, 1960, p. 106).

International Petroleum Co. will build a $13 million 450-ton-per-day fertilizer plant at its Cartagena refinery. Initially the plant is to use some 5 mmcf per day of refinery gas, and ultimately is expected to tap nearby developing natural-gas resources. Also a Montecatini fertilizer plant at Barrancabermeja operates on natural gas.

TRANSPORTATION: Combined daily capacity of Colombia's crude pipeline system totaled 23,440 bbl as of September 1960. Capacity of products pipelines was 106,700 b/d.

The 85 million 139.5-mile natural-gas line now being built by Colpet and Colombian investors from Cicuco field to Barranquilla will have a capacity of 20 mmcf per day. Products pipelines now operated by Ecopetrol from Barranca refinery are laid at altitudes of from 600 ft to 8,600 ft above sea level to deliver products to Bogota, the largest inland market.

OIL LAWS

No important changes occurred in the basic oil regulation of Colombia, although a revision to the petroleum code was proposed during the year which would have drastically altered industry regulation and increased oil-company payments.

For an accurate and concise review of Colombian oil regulation prepared by counsel within Colombia, recommendation is made of *Petroleum Legislation*, a legislative reference work for oil which is contained in several volumes, and also covers all other countries of the world. Its oil legal reviews are compiled by law firms within the country concerned, which have been recommended by oil companies operating there. The same firms keep their reviews up to date by loose-leaf revision service. Cost of *Petroleum Legislation* is $190, covering the world and including the first year's revision service. Subsequent annual revision maintenance is about half the original cost. Inquiries should be addressed to the publisher at: *P. O. Box 1591, Grand Central Station, New York 17, N. Y.*

NATIONAL FACTORS

Oil Revenues: Revenues to the government from oil operations range from 66¢ to 83¢ per barrel of oil produced—well in excess of the traditional 50-50 net-profits split. The oil industry now contributes about 15% to the yearly national budget of $360 million.

In 1958, oil's contribution to Colombia's national economy is estimated to have totaled $99 million—including local oil-company purchases,

taxes, royalties, customs, lease and interest payments, wages and salaries, etc. The value of oil exports for the period 1957 through 1959 was $430.2 million, resulting in a saving in dollar exchange of $184.6 million. Capital imported during the period amounted to $688.1 million.

The annual payroll of some $30 million to almost 13,000 oil-industry employees during 1959 represented only about 66% of total payments to employees.

A worldwide review service on taxation of the oil industry, from exploration and production through marketing—is under way and will be published during 1961. The accompanying review, COLOMBIA—PETROLEUM INDUSTRY TAXATION, is part of this study which covers the remainder of the world as well. Inquiries regarding the service, which appears to be unique and of considerable value to oil companies everywhere, should be addressed to *International Taxation Series, P. O. Box 1591, Grand Central Station, New York 17, N. Y.*

COLOMBIA
PETROLEUM INDUSTRY TAXATION*

This review covers oil industry taxation in Production (including Exploration), Transportation (Pipeline), Refining and Marketing.

The monetary unit of Colombia is the peso. The exchange rate is approximately 7.00 pesos per U. S. dollar or 14.3 U. S. cents per peso. The areal unit of measure used in Colombia is the hectare, equivalent to 2.47104 acres, and equivalent to 10,000 square meters.

Production

Taxation of production and exploration operations is as follows:

SURFACE TAXES—EXPLOITATION — *(Decree 1056 of 1953—Art. 26. Decree 2140 of 1955—Art. 12).*

	Western Region (All amounts in pesos per hectare per year)	Eastern (Llanos) Region (All amounts in pesos per hectare per year)
1st Year	0.20	0.10
2nd "	0.60	0.20
3rd "	1.00	0.30
4th "	1.40	0.40
5th "	1.80	0.50
6th " Ext.	1.20	0.50
7th "	1.50	0.50
8th "	2.00	0.50
9th "	2.50	0.50
Remaining Period	3.00	0.50
	50% reduction while rig is active	No surface taxes payable while rig is active

*Review prepared by L. V. Charlesworth, Asst. Comptroller, International Petroleum Co., Ltd., 396 Alhambra Circle, Coral Gables 34, Florida, USA.

SURFACE TAXES — EXPLORATION — *(Decree 1056 of 1953—Art. 26. Decree 2040 of 1956—Art. 14).*

Half the Exploration Surface Taxes for year prior to initiation of exploitation.

EXPLORATION COSTS — NON-EXPLOITATION PROPERTIES.

Exploration costs must be capitalized; recovery is made through depletion or through amortization if concession is surrendered (See special section following).

ROYALTIES—CRUDE OIL—INLAND PRODUCTION—*(Decree 1056 of 1953—Arts. 36 and 41. Decree 2140 of 1955—Art. 16).*

Crude from producing fields at 0-100 kilometers from coast pays 13%. A reduction of 1% is provided for every 100 kilometers inland from port of shipment down to a minimum of 3% when the producing field is at 900 kilometers or more from the sea coast. Hence, Eastern (Llanos) Region crude pays only 3% royalty.

No royalty paid on crude oil consumed in operations.

CRUDE OIL—Off Shore Production: 10% royalty.

NATURAL GASOLINE: Peso 0.05 for each 10,000 cubic feet of gas sold or used for industrial purposes (blending, etc.).

No royalty paid on natural gasoline consumed in operations.

ROYALTY EXEMPTION *(Decree 1056 of 1953—Art. 59).*

Colombian crude processed in producer's own Colombian refineries for domestic consumption is 100% exempt. If processed for export there is a 20% exemption during first 10 years of refinery.

ROYALTY PAYMENT—*(Decree 1056 of 1953—Art. 40).*

In kind or cash at government option, payable at port of shipment.

PRODUCTION TAX—Private Oil—*(Decree 1056 of 1953—Art. 44).*

Private oil from producing fields at 0-100 kilometers from sea coast pays 7% production tax. A reduction is provided for every 100 kilometers inland from port of shipment down to a minimum of ½% when the producing field is at 900 kilometers or more from the sea coast. Hence, Eastern (Llanos) Region private oil pays only ½% Production Tax.

STATE, MUNICIPAL & FLUVIAL TAXES—*(Decree 2140 of 1955—Art. 6 & 15).*

Equipment required for the exploration, development and transportation of oil, the crude and by-products obtained therefrom, the machinery and other equipment (not obtainable in the country) required for its processing and for construction and maintenance of pipelines and refineries are exempt from all Departmental (State), Municipal and Fluvial taxes.

EXPORT TAXES—*(Decree 1056 of 1953—Art. 16 & 17).*

Crude oil and its by-products are exempt from Export Taxes, during first 30 years of exploitation. However, the legislation does not establish the rates nor the basis for assessment after the tax-free period.

INCOME & ASSOCIATED TAXES—General Structure.

Colombia's normal income tax is assessed at progressive rates that rise sharply to approximately 32%. In addition, there is a patrimony tax which is assessed on the basis of the net worth of the company, i.e., its net investment in Colombia. This tax approximates 1.5% of such net worth. Any earnings which after deducting income and patrimony taxes amount to more than 12% of patrimony or net worth, are considered to be excess profits and are subject to a special surtax which is imposed at progressive rates starting at approximately 19% and rising to a top rate of 50%. Colombia also imposes two other taxes. One is a forced investment in shares of the Paz del Rio Steel Mill. It is tantamount to a tax because the market value of Paz del Rio share is very low when compared to the obligatory purchase price. The second tax is on dividends paid by a Colombian company, to a corporate shareholder.

As a result of these complex tax arrangements, the effective income tax rates and the incremental tax rates vary depending on the individual company's situation. A company with very low taxable earnings in ratio to its patrimony may well have a tax bill that exceeds the book profits of the company before income tax. This is because of the impact of non-deductibles and the heavy tax burden imposed by the patrimony tax.

INCOME TAX—Base—*(Decree 818 of 1936—Art. 87).*

Taxable income is based in booked gross income before income and associated taxes less allowable deductions, certain booked being non-deductible.

Allowable Deductions—General Rule—*(Law 78 of 1935—Art. 2, and Decree 818 of 1936—Art. 42).*

In general, allowable deductions are described as those *ordinary* and *necessary* expenses incurred *during the taxable year* which relate to the *normal functioning of the business.*

ALLOWABLE DEDUCTIONS—Depletion Factor—*(Decree 1056 of 1953—Art. 63 & 66).*

Taxpayers are required to elect during the first taxable year the depletion method they intend to adopt, i.e. Cost Depletion or Percentage Depletion. After the election is made they may change only once, provided certain requisites are complied with.

ALLOWABLE DEDUCTION—Cost Depletion—*(Decree 2140 of 1955—Art. 4 & 13).*

This is based on the unit of production method; the amount so obtained is not subject to limitation.

ALLOWABLE DEDUCTIONS—Percentage Depletion (Normal)—*(Decree 2140 of 1955—Art. 4 & 13).*

Depending upon the Region in which the producing field is located, taxpayers electing this method are allowed a deduction equal to a fixed percentage of gross value of the natural product extracted during the taxable year substracting therefrom any royalties or participations paid or accrued. The deduction is 10% in the Western Region and 28% in the Eastern (Llanos) Region. This allowance is limited to 35% in the Western Region and to 50% in the Eastern Region of Total Taxable Income, before depletion.

ALLOWABLE DEDUCTIONS—Extraordinary Depletion—*(Decree 2140 of 1955—Art. 5).*

Taxpayers investing an amount of not less than US $800,000 per year in exploration activities on areas other than those they hold under exploitation concessions, are entitled to an extraordinary depletion allowance calculated on the same basis as the "percentage depletion" of 15% in the Western Region. In the Eastern Region this allowance is included in the 28%.

This allowance together with the Normal Percentage Depletion allowance may not exceed 50% of the total taxable income, before depletion, in the Western Region. It is not applicable to the Eastern Region.

ALLOWABLE DEDUCTIONS—Amortization of Exploration Costs—*(Decree 2140 of 1955—Art. 9).*

Taxpayers who do not qualify for the 15% extraordinary depletion may elect to amortize their exploration costs at 10% in the Western Region. This is not applicable to the Eastern Region.

ALLOWABLE DEDUCTIONS — Amortization of Surrendered Concessions—*(Decree 2140 of 1955—Arts. 6 & 15).*

Taxpayers who qualify for the extraordinary depletion allowance may only amortize exploration costs which relate to surrendered acreage at 10% of cost and year in the Western Region, and 100% in year of surrender, or as capitalized investments through depletion in the Eastern Region.

ALLOWABLE DEDUCTIONS — Accelerated Depreciation—*(Decree 488 of 1954—Art. 23).*

Providing authorization is granted by the Chief of Revenue and National Taxes based upon the fact that certain specific equipment and/or installations are working more than 10 hours per day, taxpayers are allowed to use higher depreciation rates. Otherwise, depreciation in excess of allowed limits would be disallowed. (See item No. 5, below).

ALLOWABLE DEDUCTIONS—Major Non-Deductible Costs.

Following are the major non-deductible costs: 1. Company contributions to overseas annuity plans. 2. Administrative expenses—home office. 3. Accruals to pension reserves in excess of payments. 4. Exchange loss on depreciation, through the devaluation of the peso. 5. Depreciation in excess of allowed limits, i.e. 5% on buildings, 10% on furniture, machinery and equipment, and 20% on automotive equipment, except as noted above under accelerated depreciation. 6. Salaries paid in excess of limits allowed, i.e. peso 48,000 a year for managers and 24,000 a year for skilled personnel.

ALLOWABLE DEDUCTIONS—Tax—Free Income—Capital gains are exempt from income taxes.—Accordingly, capital gains or losses are referred to as those resulting from transactions occasionally made out of the main trade or business. Major capital gains or losses for an oil producer could be derived from: 1. Occasional sale of stocks and bonds. 2. Occasional sale of land. 3. Exchange differences on balance sheet accounts, arising from fluctuations in the value of the peso.

ALLOWABLE DEDUCTIONS—Schedular Rates—Tax calculations are made based upon a graduated scale of 43 brackets ranging from 1% for taxable income of pesos 2,000 up to 31.75% for that portion of taxable income in excess of pesos 5.0 million.

ALLOWABLE DEDUCTIONS—Withholding Tax—*(Law 78 of 1935—Art. 2).*

Extraterritorial costs, i.e. services, commissions, etc. paid or accrued to a third party with residence in a foreign country, are accepted as a deduction from income only when 12% tax is withheld at source.

PATRIMONY TAX—Base—*(Decree 270 of 1953—Art. 31).*

The base for the calculation of Patrimony (Capital) Tax is made up as follows: Net Worth—Add: Appraisals and or revaluations of stocks, bonds and real estate. Current year's depreciation provision. Deduct: Capital in the exterior. Government securities. Paz del Rio shares.

PATRIMONY TAX — Tax — Free Patrimony—*(Decree 1056 of 1953—Art. 62).*

Capital invested in exploration is not subject to Patrimony Tax providing this exemption is applied for by taxpayer. Also capital invested in Paz del Rio Shares is not subject to Patrimony Tax; in this case no election is required.

PATRIMONY TAX—Schedular Rates—*(Decree 270 of 1953—Art. 31).*

First pesos 1.0 million pays pesos 9,700; patrimony in excess of that amount pays a flat rate of 1.5%.

EXCESS PROFITS TAX—Base—*(Decree 2247 of 1936—Art. 8).*

Taxable income after deducting Income and Patrimony Taxes in excess of 12% of patrimony plus Pax del Rio shares, at par value, is subject to Excess Profits Tax.

EXCESS PROFITS TAX—Schedular Rates.

First portion of income subject to Excess Profits Tax not in excess of 3% of patrimony pays 18.75%; there are other six brackets, all based on percentage of patrimony, the last of which taxes at 51.25%

the remaining profits over 50% of patrimony.

PAZ DEL RIO TAX—Base—*(Decree 261 of 1950—Art. 1).*

Taxable income in excess of initial exemption of peso 5,000 plus Income, Patrimony and Excess Profits Taxes is subject to Paz del Rio Tax calculated at the flat rate of 4%.

PAZ DEL RIO TAX—Election to Subscribe Stocks—*(Decree 285 of 1955—Art. 12).*

Taxpayer may elect to subscribe Paz del Rio Steel Mill Shares, face value peso 10.00 per share, in an amount equal to the tax levied. This election is the common practice.

PAZ DEL RIO TAX — Allowable Deduction — *(Decree 261 of 1950—Art. 7).*

Paz del Rio Stock subscription is allowed as a deduction from income in the year in which subscription is paid.

DIVIDEND TAX—Optional Tax—*(Decree 2615 of 1953—Art. 1).*

Dividend income is subject to the normal income and associated taxes. However, corporations may annually elect to pay at a flat tax rate of 5%. Corporations making this election are exempt from payment of all other income and associated taxes (Patrimony Tax, E. P. Tax and Paz Del Rio) on upstream dividend income.

INCOME TAX LIMITATION — *(Decree 2140 of 1955—Arts. 1º & 4).*

Income and associated taxes are limited for oil producers to a percentage of taxable income plus royalties: 50% in the Western Region and 40% in the Eastern Region.

Transportation (Pipe Line), Refining and Marketing

Laws applicable to transportation operations (pipeline) and to Refining and Marketing operations are listed in this section. All the laws cited under Production are *not* applicable to transportation, refining or marketing operations unless listed herein.

TRANSPORTATION TAX — Pipelines — *(Decree 1056 of 1953, Art. 52. Decree 2140 of 1955, Art. 17).*

Transportation: Based on throughput multiplied by the tariff. Rates are 6% on crude from the Western Region, 2% on crude from the Eastern (Llanos) Region.

Refining & Marketing: Not applicable.

STATE, MUNICIPAL & FLUVIAL TAXES—*(Decree 2140 of 1955, Arts. 6 & 15).*

Transportation: Same as for production to extent applicable to pipeline operations.

Refining and Marketing: Same as for Production to the extent applicable to refining operations; not applicable to marketing operations.

INCOME AND ASSOCIATED TAXES — General Structure.

Transportation: Same as for Production.

Refining and Marketing: Same as for Production.

INCOME TAX—Base—*(Decree 818 of 1936, Art. 87).*

Transportation: Same as for Production.

Refining and Marketing: Same as for Production.

INCOME TAX — Allowable Deductions — General Rule—*(Law 78 of 1935, Art. 2. Decree 818 of 1936, Art. 42).*

Transportation: Same as for Production.

Refining and Marketing: Same as for Production.

ALLOWABLE DEDUCTIONS — Accelerated Depreciation—*(Decree 488 of 1954, Art. 23),* **Major Non-deductible Costs, Tax-Free Income, Schedular Rates**—*(Decree 2317 of 1953, Art. 15),* **Withholding Tax**—*(Law 78 of 1935, Art. 2).*

Transportation: Same as for Production.

Refining and Marketing: Same as for Production.

PATRIMONY TAX—Base—*(Decree 279 of 1953, Art. 31),* **Tax-Free Patrimony**—*(Decree 1056 of 1953, Art. 62),* **Schedular Rates**—*(Decree 270 of 1953, Art. 31).*

Transportation: Same as for Production.

Refining & Marketing Operations: Same as for Production.

EXCESS PROFITS TAX—Base—*(Decree 2374 of 1936, Art. 8),* **Schedular Rates.**

Transportation: Same as for Production.

Refining and Marketing: Same as for Production.

PAZ DEL RIO TAX—Base—*(Decree 261 of 1950, Art. 1),* **Election to Subscribe Stocks**—*(Decree 285 of 1955, Art. 12),* **Allowable Deduction**—*(Decree 261 of 1950, Art. 7).*

Transportation: Same as for Production.

Refining and Marketing: Same as for Production.

DIVIDEND TAX—Optional Tax—*(Decree 2615 of 1953, Art. 1).*

Transportation: Same as for Production.

Refining and Marketing: Same as for Production.

END

ECUADOR

EXPLORATION: Ecuador's large tertiary coastal belt, with a sedimentary sequence of marine tertiary deposits up to 30,000 ft. thick, offers attractive geological prospects. Production has remained restricted to Santa Elena peninsula, however, where the Palocene Atlanta sands at 4,500-5,000 ft. yield the bulk of output in the Ancon field of Anglo Ecuadorian and the Tigre field of Tennessee.

Widespread wildcatting in the middle and northern area has so far been unsuccessful. Tennessee drilled two wells in Manabi, in the region of Mante, where International about 20 years ago has drilled six wildcats, all abandoned including two wells in the Daule basin in the region of Balzar. Tennessee holds concessions in Santa Elena and Esmeraldas province, a total of 3 million acres, and is continuing geological surveys in Esmeraldas.

California del Ecuador, subsidiary of Standard of California carried out extended geological, geophysical and seismic surveys in 1960. It drilled two offshore wells in the Gulf of Guyaquil to a depth of 4,400 and 4,107 feet, respectively, of which one reportedly struck oil shows, but both were abandoned. A third wildcat, on Puna Island, struck basement. California has now suspended operations and withdrawn from the country. United Fruit Co., by its subsidiary Agrippa, has taken around 1.5 million acres east of the Gulf of Guyaquil and the mouth of the Guyas River.

Anglo-Ecuadorian Oilfields, Ltd. completed the re-mapping of their concession area, but drilled no exploratory wells in 1960. Two semi-exploratory step-outs from the Ancon Field were drilled; one was an oil producer, the other dry. Sixty five development wells were drilled in the Ancon field, all giving oil production. Of these, thirty were deep (3,000-5,000 ft.) and thirty-five shallow (1,000-2,000 ft.) (including estimate for last seven weeks of the year.)

Esso Standard (Inter-America) a wholly owned subsidiary of Standard Oil Co. (New Jersey), in 1960 paid about $2 million for just under 750,000 shares of Anglo-Ecuadorian's 4,500,000 outstanding shares. The seller was South American Gold & Platinum Co. Another big block of Anglo-Ecuadorian stock is owned by Lobitos Oilfields, Lt., with whom Jersey has a joint working agreement on a 136,424 acre Peruvian concession through its affiliate, International Petroleum Co., Ltd. Lobitos and Standard holdings combined come to just over 50% of Anglo-Ecuadorian's outstanding shares.

PRODUCTION: Production, hampered by the low ceiling prices, declined in 1959 by nearly 10% to 7,734 b/d. Anglo-Ecuadorian Oilfields, including Caroline Oil Co. and Petropolis Oil Co., two local producers at Santa Elena, operated also by Anglo-Ecuadorian, raised slightly its output from 6,600 b/d to 6,828 b/d. Tennessee del Ecuador, subsidiary of Tennessee Gas Transmission Co., which entered the country in 1958 and acquired the holdings of Manabi Exploration Co., produced less (see Table).

TRANSPORTATION: A 210-mile products pipeline is being constructed from the Port of Duran to Quito, the capital. Its capacity will be 3,000 b/d products.

REFINING: After raising the ceiling prices, the new refinery, of Anglo-Ecuadorian, at La Libertada of 7,000 b/d was completed January 9, 1960. The topping plant of Tennessee in its Cautive Field was enlarged from 800 to 1,600 b/d.

DEMAND: Ecuador's domestic demand is about 8,500 b/d. It requires oil imports to satisfy oil requirements.

The retail price of premium gasoline, 80 octane, was reduced to 27 cents per gallon, as of March 2, 1960, and further lowered to 26.2 cents, as of April 22, 1960. The prevailing retail price of this gasoline was 34.5 cents per gallon, in 1959.

OIL LAWS

No changes occurred in Ecuador's oil laws as they regulate exploration and exploitation of petroleum. The principal law is No. 70 of 6 August, 1937, as amended 8 April, 1938. For a summary of the laws' requirements, see WORLD PETROLEUM REPORT—1957, p. 87, and for a briefer summary, the 1958 edition, p. 101.

Entire translated text of Ecuador's oil legislation has been published in a noteworthy collection, *"South America—Basic Oil Laws and Concession Contracts."* It is a word-for-word compilation of applicable laws, an interesting and useful collection which includes oil regulation for the other countries of the Middle East as well. For information address inquiries directly to its publisher, *"Petroleum Legislation Ltd., Post Office Box 1591, Grand Central Station, New York 17, New York.*

NATIONAL FACTORS

The investment history is excellent and government attitudes, very good.

A detailed study of taxation of petroleum in Ecuador has been prepared for publication in 1961 under the title of *"International Taxation Series."* This series is devoted to petroleum taxation, covering every type of tax imposed on petroleum operations in all countries. Marketing, refining, transportation, exploration and production taxes are covered, with a separate study of each. For an example of one of these national studies (all are prepared in exactly the same format) readers are referred to the Columbia section of this issue of World Petroleum Report, that section entitled "Colombia—Petroleum Industry Taxation." Requests for information on the entire series should be addressed to *"International Taxation Series," Post Office Box 1591, Grand Central Station, New York 17, New York.* END

SURINAM (Dutch Guiana)

No activity was reported during 1960. A concession is reportedly held by American interests, but this has not been confirmed. END

PERU

EXPLORATION: In exploration the most significant feature in 1960 was the activity of Peruvian Pacific Petroleum Co., subsidiary of Cities Service and Richfield, on the Peruvian shelf. The company is using a drilling boat "Rincon," offshore. In 1959, five offshore wells exceeding 6,000 ft. in depth were drilled, of which three struck oil with a yield from 200 to 400 b/d. The company renewed drilling in April 1960, completing five additional wells, one also exceeding 6,000 ft. in depth. The most remarkable venture was connecting well Humboldt 3-3, which yielded 200 b/d by a submarine pipeline.

Empresa Petrolera Fiscal has been authorized by the government to renew drilling in the region of the Titacaca lake at Pirin, the highest oil field of the world at an altitude of some 13,000 ft. About 50 years ago some 300,000 bbl of oil in shallow wells were recovered by an enterprising Chilean company. Later drilling by Empresa, some 20 years ago, remained unsuccessful; but, because of local demand in this remote region, even a reduced output would be important. In case of success, a local refinery at Puno will be considered. Petrolera Fiscal is also preparing to drill a wildcat at Zarumilla, near the Ecuadorian frontier in the northernmost section of Peru's coastal area.

Cerro de Pasco Petroleum Corp., which is a wholly owned subsidiary of Cerro de Pasco Corp., began drilling operations on its concession in eastern Peru in 1960. The first test is being drilled in the southern part of the Montaña sedimentary province of the company's concession Oxampappa No. 7, in the Palcazu River basin, about 140 miles south of Pucallpa, the principal town of the southern Montaña. This basin has been the chief focus of Cerro's geological and geophysical investigations for the past several years. Several drillable prospects have been mapped, and the geological conditions generally prevailing in the area are believed to be favorable for the accumulation of oil and gas.

Petrolera Amotape SA, a subsidiary of Amotape Oil Co., put into production on August 26 well C-20, which flowed 19 bbl per hour, through the casing on a ½-in. choke during the first three days, and was then placed on a ¼-in. choke; and was then flowing approximately 140 b/d. This well was drilled on another section northwest from the "Carpitas" producing field, to a depth of 2,400 ft., but was completed at 1,400 ft. to the "Verdun" formation. The properties of Amotape Oil Co. are located on the north coast of Peru, adjacent to Com-

(Continued on page 247)

PERU
PETROLEUM INDUSTRY TAXATION[1]

This review has been compiled to show information in which a new enterprise would be interested under the terms of Law No. 11,780 of 1952. Taxation of profits from refining, marketing, and transportation operations would depend largely on corporate organization that is already established. As this review indicates, branches of foreign companies pay income taxes which are different from those to which Peruvian corporations are subject.

The monetary unit used is the Peruvian sole. The unit of area used is the hectare, equivalent to 2.47104 acres.

[1] Review prepared by L. V. Charlesworth, asst. comptroller, International Petroleum Co. Ltd., 396 Alhambra Circle, Coral Gables 34, Fla., USA.

Exploration and Production

ROYALTY—None.

TAXES ON PROFITS—Principal Income Tax: In the coastal region income tax is 50% (Art. 90). In the eastern and mountain (Montana) regions, income tax is 10% during the first 10 years of exploitation; 25% during the second 10 years of exploitation; 35% during the third 10 years of exploitation; and 50% during the remaining concession period (Art. 93). **Unemployment Tax—Complementary Tax on Profits—Complementary Tax on Dividends:** None (Art. 104).

CONCESSION TAXES (EXPLOITATION)

Concession Period (Art. 42)			
Original period	40 years	45 years	50 years
Extension period	20 years	25 years	25 years
Annual Surface Tax Per Hectare (Art. 85) (in soles)			
First 5 years	10.00		
Next 5 years	30.00		
Next 5 years	60.00	50% of amount shown under Pacific Coastal Region.	25% of amount shown under Pacific Coastal Region.
Next 5 years	100.00		
Next 5 years	80.00		
Next 5 years	40.00		
Remaining concession period	30.00		
Annual reduction per hectare for every two tons production (Art. 86) [Deductible for tax purposes but no carry-forward in case of loss (Art. 91)]	10.00	5.00	2.50
Initial one-time exploitation tax per hectare (Art. 89)			
Original period	30.00	15.00	7.50
Extension period (Art. 122) [Not deductible for tax purposes except where an exploitation concession results from the exploration concession, in which case this tax may be considered as an amortizable investment (Regulations Art. 198)]	60.00	30.00	15.00

NON-DEDUCTIBLE COSTS—For provision for pensions and for insurance, see section below under "Special Deductions, *Provisions for the Formation of Reserves.*" For home-office administrative expense, see section below under "Special Deductions, *Administration Expense.*"

SPECIAL DEDUCTIONS—Depletion *(Provisions under Petroleum Law No. 11780):*

	Coastal Region		Eastern and Mountain Regions	
	Foreign Company (a)	National Company (b)	Foreign Company (c)	National Company (d)
Depletion Allowance	15% (Art. 92)	25% (Art. 92)	27½% (Art. 94)	27½% (Art. 94)
Basis for Calculating Depletion Allowance	Total gross value of production calculated in accordance with Art. 95 (value of crude in port of shipment based on quotation at selling point) and, in case of eastern and mountain regions, deducting the cost of transportation from the field to the port of shipment (Art. 92 and 94)			
Limit of Depletion Allowance	(a) 50% of net profit after deducting depletion allowance and 20% minimum advance payment of income tax (Art. 92)—See Item 6-A for advance payment (b) (c) (d) 50% of net profit before deduction of depletion allowance or advance payment of income tax (Art. 94 and Art. 204 Regulations)—See Basic Export Tax for advance payment.			
Provisions for the Formation of Reserves:	Coastal, Eastern, and Mountain Regions			
Provisions to cover normal future expenses provided the eventuality of their employment and the amount can be reasonably estimated such as obligations resulting from social and labor legislation, labor contracts, insurance pensions, and the repair or replacement of assets. Presumably would include provisions for pensions and insurance reserves and depreciation on replacement cost basis.	Regulations (Art. 196)			

CONCESSION TAXES (EXPLORATION)

	Coastal Region	Mountain Region	Eastern Region
Concession Period (Art. 23)			
Original period	3 years	5 years	6 years
First extension	1 year	2 years	2 years
Second extension	1 year	2 years	2 years
Annual Surface Tax Per Hectare (Art. 84)			
Original concession period	2.00	1.00	0.50
First extension	4.00	2.00	1.00
Second extension [Not deductible for tax purposes except where an exploitation concession results from the exploration concession, in which case this tax may be considered as an amortizable investment—Regulations Art. 198]	6.00	3.00	1.50
Guarantee Deposit Per Hectare (Art. 31) (soles)			
Original period [refundable if concession renounced or expires. Carried on through exploitation period if concession is converted.] May be forfeited for non-compliance (Art. 32)	6.00	4.00	2.00
Extension period non-refundable (Art. 121)	3.00	2.00	1.00

TAX INCENTIVES—In addition to the provisions of Petroleum Law No. 11780 mentioned above, Industrial Law No. 13270 promulgated on November 30, 1959 and its regulations published on April 26, 1960, grant far-reaching tax and other benefits to industries which qualify as producers of basic or non-basic articles whether already established or to be established. Among such industries are those formed for the manufacture of petroleum and chemical products. A brief summary of these benefits is shown below.

PERU—Summary of Tax and Other Benefits Established Under Industrial Law No. 13270

Permanent Franchises	Basic Industries Established (a)	Basic Industries To be Established (b)	Non-Basic Industries Established or To be Established (a)
1) Exemption from import duties (with certain exceptions) on new machinery and equipment, raw materials or semi-manufactured products, necessary to the industry and not available locally.	100% (Art. 32)	100% (Art. 32)	50% to 100% (Art. 35)
2) Right to purchase or rent fiscal properties.	Yes (Art. 32)	Yes (Art. 32)	No (Art. 35)
3) Right to request expropriation of private unused non-urban properties.	Yes (Art. 32)	Yes (Art. 32)	No (Art. 35)
Temporary Franchises—Initial period			
4) Exemption, during the first years after establishment of the plant, of all taxes other than fiscal stamps, as follows: Lima and Callao 3 years; Coast 5 years; Mountain 10 years; Jungle 15 years	No	100% (Art. 33)	No
Temporary Franchises—Subsequent years	(———— Art. 33 & 34 ————)		(—— Art. 36 ——)
5) Exemption from all taxes affecting production or transport of produce, other than taxes on income, business licence, fiscal stamps, consumption taxes and municipal levies.	15 years	15 years	15 years
6) Freedom to invest, free from all taxes, in the expansion of the plant or in certain other items a proportion of yearly profits:			
Lima and Callao	30% during 15 years		40% during 10 years
Coast	50% during 20 years		60% during 15 years
Mountain	80% during 40 years		80% during 30 years
Jungle	100% during 50 years		100% during 40 years
7) Depreciation of machinery, spares and installations on appraised values when local currency depreciates more than 5% in a given year with regard to the U. S. dollar.	Yes	Yes	Yes
8) Accelerated depreciation in certain instances, such as round-the-clock usage of machinery and equipment; when these are replaced by others of increased output; in cases of new articles which the government is interested in fostering, etc.			
Lima and Callao	during 10 years		during 10 years
Coast	during 15 years		during 15 years
Mountain	during 30 years		during 30 years
Jungle	during 40 years		during 40 years
9) Reduction in profits tax rates in Mountain and Jungle (Art. 33), as follows:			
Mountain—during first 10 years	40%	40%	40%
Mountain—during next 10 years	30%	30%	30%
Mountain—during next 10 years	20%	20%	20%
Jungle—during first 10 years	50%	50%	50%
Jungle—during next 10 years	40%	40%	40%
Jungle—during next 20 years	30%	30%	30%

Notes: a) Time limits for franchises are taken from date of issuance of the Regulations to the Law.

b) Industries established within 10 years of the issuance of the Regulations to the Law; time limits for the franchises are taken from date of establishment.

c) Regarding 6, if investments exceed availability of profits, the franchise may be carried over for 5 subsequent years.

EXPORT TAX (Based on value of crude oil at port of shipment):

	Coastal Region	Eastern and Mountain Regions
Basic export tax—Represents non-refundable advance payment of income tax	20% (Art. 95)	First 10 years exploitation— 3% Second 10 years exploitation— 5% Third 10 years exploitation— 7% Remaining concession period—10% (Art. 96)
Unemployment Export Tax		1% (Law 7103, Art. 1.a.)
Mining Bank Tax		1% (Law 9157, Art. 5.b.)

ANNUAL EXPLOITATION SURFACE TAX (See Concession Taxes)—(Art. 91) No carry-forward in case of loss.

EXPLORATION EXPENSES—(Art. 91 and Regulations Art. 195).

EXPLOITATION EXPENSES including dry holes, prior to production—Regulations (Art. 193).

ADMINISTRATION EXPENSE irrespective of place incurred; intangible drilling cost; provision for severance benefits—Regulations (Art. 192).

LOSSES IN INVESTMENT resulting from destruction, consumption, obsolescence, theft, or misappropriation—Regulation (Art. 197).

AMORTIZATION OF INITIAL EXPLOITATION CONCESSION TAX AND EXPLORATION SURFACE TAXES where the exploitation concessions are derived from the exploration concessions (See Concession Taxes)—Regulations (Art. 198).

Note: Where reference is made to the regulations only and not to the law itself, the position is not as strong as if such provisions were contained in the law. The applicability of such provisions has not yet been tested.

(Continued from page 246)

pañia Petrolera Libitos and International Petroleum Co. Ltd. fields. Well C-21, an offset of well C-20, is being drilled. Drilling operations will continue in this section, where approximately 40 wells have been projected by Amotape's geologists. The oil produced is of sulfur-free content, with ½% paraffin base and of 39 API gravity.

PRODUCTION: Crude production increased in January 1960 to around 51,700 b/d, plus 2,735 b/d of condensate. However, total output for 1959 had declined by nearly 6% from 51,320 b/d in 1958 to 48,464 b/d, 17,725,847 bbl, in 1959. In addition, there was a natural-gasoline production of around one million barrels or about 2,700 b/d, from International's Brea-Pariñas and the Libitos fields, including a small share of some 10,000 bbl total from Empresa Fiscal. Recovery of natural gasoline amounted in Brea-Pariñas to an average 1.53 gal per 1,000 cu ft gas, and in Lobitos to 1.41 gal.

REFINING-MARKETING: Peru's local demand in 1959 was estimated nearly 45,000 b/d. Refining capacity will be shortly expanded to 60,000 b/d. Besides enlarging International's 45,000 b/d refinery at Talara, a new national refinery of 12,000 b/d will be constructed south of Lima itself in Conchan on the coast at *km. 29* of the Panamerican Highway.

OIL LAWS

No changes occurred in Peru's basic oil legislation, as it was set forth in the 1952 Petroleum Law. However, a drastic revision of laws aimed at International Petroleum Co.'s holdings in Talara has been proposed.

Entire text of Peru's oil legislation has been published in a noteworthy collection *"South America—Basic Oil Laws and Concession Contracts."* It is a word-for-word compilation of applicable laws, an interesting and useful collection which includes oil regulation for the other countries of South America as well. For information, address inquiries directly to the publisher: *Petroleum Legislation Ltd., P. O. Box 1591, Grand Central Station, New York 17, N. Y.*

NATIONAL FACTORS

General economic conditions of Peru has largely improved under the new cabinet. The budget has been balanced, inflation halted, and the dollar exchange rate stabilized increasing reserves of the Banco de Reserva. By sharply augmenting exports and raising dollar inflow, the trade balance has become positive.

A detailed study of taxation of petroleum in Peru has been prepared and will be available during early 1961 under the title of *"International Taxation Series."* This series is devoted exclusively to petroleum taxation, covering every type of tax imposed on petroleum operations in all countries. Marketing, refining, transportation, exploration and production taxes are covered, with a separate study of each. For an example of one of these national studies (all are prepared in exactly the same format) readers are referred to that section entitled *"Peru—Petroleum Industry Taxation."* Requests for information on the entire series should be addressed to *"International Taxation Series," Post Office Box 1591, Grand Central Station, New York 17, New York.* END

VENEZUELA

Activity declined in 1960. The only exception was crude production, which gained about 2.7%, but even this gain was far below the 7.9% average increase established in the previous 10 years. Dollar income by the government dropped sharply to $1,158,000,000 in 1960 from $1,357,000,000 in 1959, and oil-company investments declined 20% from the already-low 1959 levels.

EXPLORATION: While some good discoveries were made, particularly by Sun Oil in Lake Maracaibo, drilling activity declined during 1960 to 410 wells drilled, the lowest point in many years, and 42% below 1959 levels.

No seismic parties were operating at the end of 1960. Surface exploration was down to 44.5 party-months during 1960, compared with 159.4 in 1959. The Petroleum Industry Chamber in Venezuela, which has produced most of the exploration summaries for 1960, estimated surface exploration to be only 10% of the average level during the previous eight years, and exploratory drilling to be down to about one-third of that same period.

Paria Operations. During January 1961, it was announced the Paria Operations group had suspended operations while findings of 20 wells drilled were being re-evaluated. Six of the wells drilled were said to be producers, but production is relatively low, and at present development is not considered economic. The Paria group paid $101 million initial concession payment and invested about $28 million in exploration and development. Ohio, Texaco, and Continental Oil each holds 25%; Cities Service has 16⅔%; and Richfield Oil 8⅓%.

Pan Am International abandoned its first Gulf of Paria test at 6,890 ft during 1960. Offshore operations have been suspended during evaluation of No. 1 Copa which suffered lost circulation.

Government Oil Company: During April 1960, the government issued statutes for a new national oil company. Its statutes, which have been published in Caracas papers, provide separate legal status and independent assets, although it is attached to the Ministry of Mines and Hydrocarbons whose minister is head of a nine-man general council appointed by the president and charged with determining long-range plans and policies. Executive direction is by a board, with members and president selected from the membership of the general council.

The assets of the company include (1) the Anaco-Caracas and Caracas-Valencia gas-transmission pipelines, with their related networks and properties; (2) oil development parcels (including some in Lake Maracaibo); (3) other: such as capital from the government (unspecified as yet), properties transferred to the corporation by the government (which could include the Moron petrochemical plants), and the power to borrow money and issue bonds.

The company's objectives are exploration, exploitation, manufacture and refining, transport and marketing of oil within and without the country. It would also carry out "any other activities" which would contribute to the company's objectives.

Conservation: Two new gas-injection projects will permit a 35-million-barrel boost in oil recovery in Anzoategui, eastern Venezuela. One is a $7.1 million joint project of Mene Grande and Creole to compress and inject 82.8 million cubic feet of gas daily in the Mata-Zapatos field (Zeta area) to boost recovery of 31.8 million barrels. The other is an $810,000 Texaco project to compress and inject eight million cubic feet daily into the Mata field for recovery of an added 3½ million barrels of crude.

The world's largest unitization project went into operation in 1960 in Lake Maracaibo, with four companies agreeing to handle their own production on an equity basis. The unit covers output from the Lower Lagunillas pool in the Bachaquero field, and will control production of an estimated 630 million barrels of primary reserves. Initial production on the 13,200-acre tract is about 200,000 b/d. The four companies and their share of production are Shell de Venezuela, 60.64%; San Jacinto, 16.19%; Ceole, 13.67%; Mene Grande, 9.68%. San Jacinto (a newcomer) holds its 1,967-acre tract with five other partners.

TRANSPORTATION: During 1960, a 70-mile 30-34-in. crude-oil pipeline was completed from Lake Maracaibo fields to Puerto Miranda, where a big new loading terminal had been built.

The new Anaco-Caracas gas pipeline was recently put in service. The pipeline is part of the Anaco-Caracas-Moron-Barquisimeto system, which continues on to the oil fields of Bolivar district in Zulia state, which will supply gas for industrial and domestic use in central and western Venezuela. It is the first link in the planned network of national gas pipelines, in a government program to be carried out at an estimated cost of $448 million. The total extension will be of about 1,000 miles.

The first section now in service is 26-in. pipe about 200 miles long. From now on, the large thermoelectric plant at La Mariposa, near Caracas, will operate on gas from the new pipeline.

REFINING: A 50,000 b/d oil refinery at El Palito, located on the Caribbean coast near Puerto Cabello, Venezuela, was placed in operation during July 1960 by an affiliate of Mobil International Oil Co. It processes crude from Barinas province, southwestern Venezuela, to which it is linked by a 210-mile pipeline. The refinery is designed to manufacture three grades of gasoline, kerosine, jet fuel, diesel oils, and heavy fuel oils. Some of the automotive fuels are sold through Mobil Oil Co. de Venezuela's rapidly expanding service-station network within Venezuela. A $2,500,000 lubricant-blending plant, also at El Palito, is capable of supplying 100,000 bbl. of lubricants annually for the Venezuelan market.

Gulf is adding 65,000 b/d crude capacity at its Puerto la Cruz plant; Richmond, 5,000 b/d at its Bajo Grande plant, now 30,000 b/d. Shell has added a third crude-oil distilling unit at Cardon to expand capacity to 60,000 b/d from 40,000. A second naphtha fractioning unit at Creole Petroleum's Amuay refinery is now in operation.

In 1960, the government temporarily lifted the 8% penalty tax it imposes on Venezuelan crude from new concessions which crude is refined in certain Caribbean countries to allow Texaco to proces up to 200,000 bbl in a year at its refinery in Trinidad (where it is now refining Arabian as well as other oils). The crude involved in the tax move would be drawn by Texaco as part of its share of offshore production of Paria Operations Inc.—which also includes Continental, Ohio Oil, Cities Service, and Richfield.

NATIONAL FACTORS

With the possible exception of the labor situation, almost every aspect influencing investment in Venezuela worsened during 1960 and early 1961. The government was forced to institute exchange control over the once-firm bolivar late in 1960 to slow a flight of capital estimated at $600 million in 1960. Capital investment has dropped 60%, according to published sources, and leftist agitation has grown, culminating in disorders and riots during late 1960.

Exchange Regulations: Regulations governing the sale of Venezuelan foreign exchange were issued November 9, 1960. They are applicable to Executive Decree 390 of November 8, 1960. They do not affect oil, at least not as presently written. The oil companies retain their present exchange rate of 3.09 bolivares per dollar. The government is putting pressure on employees of companies, however, to use conventional channels in cashing their dollar payroll checks; also to make oil companies pay employees in bolivares instead of dollars. This would oblige them to purchase dollars for remittance home.

Labor: New labor contracts were signed in 1960. They cover the coming three years, and provide wage increases of 10% to 12%. Work week is reduced to 44 hours for labor, and to 40

VENEZUELA—Petroleum-Industry Taxes and Percentage Ratio to Industry's Net Profit, 1943-59[1]
(Millions of Bolivares and Percentage)

Year	Hydrocarbons Taxes[2]	Income Tax[3]	Import Duties	Other Taxes	Total Petroleum-Industry Taxes	Petroleum Industry's Net Profit	Excess of Taxes Over Industry's Net Profit	Percentage Ratio Government's Taxes to Industry's Net Profit
1943	109.93	19.62	19.88	5.17	154.60	99.00	55.60	61/39
1957	1,538.36	1,198.40	101.12	109.21	2,947.09	2,773.51	173.58	52/48
1958	1,359.41	1,464.91	75.86	78.46	2,978.64	1,616.26	1,362.38	65/35
1959	1,635.52	1,248.93	48.74	75.20	3,008.39	1,335.27	1,673.12	69/31
Total	13,098.12	9,580.31	1,054.15	838.10	24,570.68	19,240.99	5,329.69	56/44

[1]Tax receipts with the exception of hydrocarbons taxes for 1943-56 which represent accruals. Hydrocarbons taxes for 1959 include 221 millions of bolivares in complementary taxes. The exchange rate for the petroleum industry is 3.09 bolivares equals one US dollar.

[2]Does not include bonus payments for concessions.

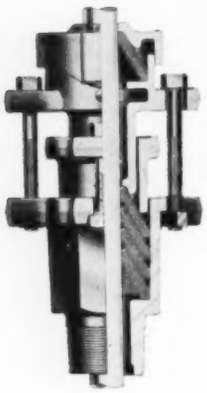
[3]The series represents figures recently revised by the Income Tax Administration. The income-tax figures have been shifted back one year so as to correspond with the year of accrual. For example, 1959 income-tax receipts were accrued in 1958.

SERVING THE PETROLEUM
INDUSTRY ON TWO
CONTINENTS
Franklin
SUPPLY COMPANY

HERCULES CONE PACKED STUFFING BOXES

Provide the ultimate in SAFETY, ECONOMY and EASE of operation

Hercules Stuffing Boxes — like all Hercules Products — are improved constantly to meet the changing needs of the industry and are available in three styles. They are used internationally and are available through supply houses, everywhere.

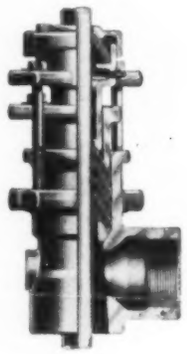


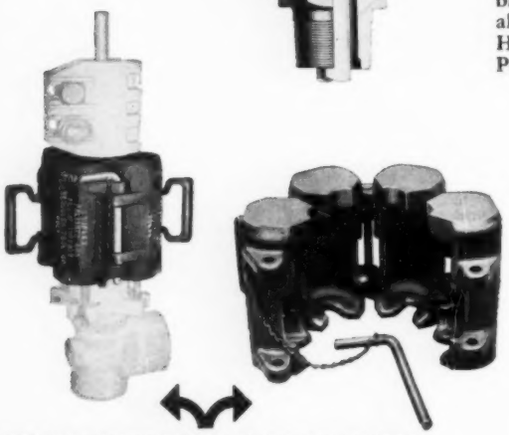
HERCULES REGULAR TYPE DUPLEX STUFFING BOX

More efficient operation with fine adjustment possible. Offers longer packing life due to ability of Packing and Glands to follow lateral movement of Polished Rod. Malleable iron construction prevents breakage if rods are accidentally dropped on Stuffing Box. Has male thread to screw into Pumping Tee.

HERCULES TEE TYPE DUPLEX STUFFING BOX

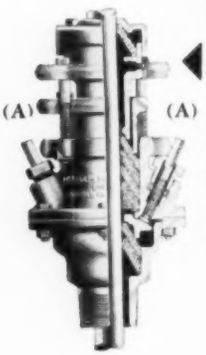
A combination Tee and Stuffing Box only 15" high. Eliminates one threaded connection between Stuffing Box and Tee. Full opening — allows rods to be run or pulled without removing Stuffing Box body. Has female thread to screw directly onto tubing.





HERCULES POLISHED ROD CLAMP-OFF SUPPORT

Used with Hercules Regular and Tee Type Stuffing Boxes to *prevent accidents* or personal injuries while clamping off. Manufactured from high tensile aluminum alloy, will safely support 30,000 lbs. weight.

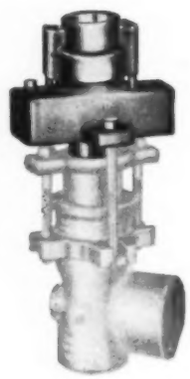


HERCULES TYPE DP (Double Packed)

Duplex Stuffing Box for use on high pressure or intermittently flowing wells. Allows Main (upper) Packing to be safely and easily replaced while well is under pressure. The two compression bolts (A) are turned clockwise until the lower Packing seals off. The Main Packing can then be removed and replaced.

HERCULES OIL RESERVOIR GLAND

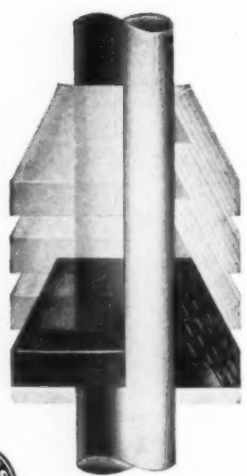
All Hercules Stuffing Boxes may be equipped with *Oil Reservoir Upper Gland* on *problem* wells which pump off and burn packing. The polished rod runs through the Reservoir, and is cooled and lubricated by its fluid.



For Best Results in Hercules Stuffing Boxes, use only

HERCULES CONE-SHAPED PACKING RINGS

Each set of Hercules Cone-Shaped Packing Rings now include the NEW, SOLID Split Bottom Cone Packing Ring. This new solid ring provides greater contact with the polished rod and a more substantial base for the upper Packing Rings, resulting in *longer* packing life and superior performance. A complete set now consists of three *regular* and one new split *Bottom Cone* Ring.



THERE'S A TYPE SPLIT CONE PACKING RING FOR EVERY REQUIREMENT:

Hercules Split Cone Packing Rings come in four grades: SOFT, HARD, SPECIAL LUBRICATED and HEAVY DUTY. SOFT Rings are always used with bronze liners or with steel polished rods in wells which are not always pumping fluid. HARD Rings are recommended for steel polished rods only, and where fluid is constantly being pumped. SPECIAL LUBRICATED Rings are recommended for problem wells which pump off persistently. When well is pumped dry, the rings lubricate the polished rod and prevent the packing from burning until fluid is again present. HEAVY DUTY Rings are recommended for problem wells. Properly adjusted, they give phenomenal life.

ACCEPT NO SUBSTITUTES

Ask for and accept only Hercules Cone-Shaped Packing Rings for use in all HERCULES Duplex Stuffing Boxes. All HERCULES Products are available through Your Supply Store.

Export Representative:
OILFIELD EQUIPMENT COMPANY, INC.
(T. E. Ward, Jr., Pres.)
90 West Street
New York 6, N. Y.

HERCULES TOOL COMPANY
Manufacturers of Oil Field Equipment
GENERAL OFFICES AND PLANT • TULSA, OKLAHOMA

take NEWTHERM on test!

Test its STRENGTH

NEWTHERM is unusually strong and rigid — a feature of special importance in the larger, more vulnerable sections. Put a sample section or slab on part of your plant and *prove for yourself* its outstanding ability to withstand impact and water damage. See how it withstands rough handling in transit and erection, minimising breakage in shipment and erection by unskilled labour at the most remote sites.

Test its MOISTURE RESISTANCE

Even totally immersed in water, NEWTHERM retains much of its strength and rigidity. It does not become deformed when in contact with water, thus work-in-progress need not be covered. Especially on contracts where weather conditions would delay the application of insulation — NEWTHERM is the material to use.

Test its LIGHTNESS

Unusually light for such a high-efficiency material, NEWTHERM compares favourably in this respect with other insulants far inferior in strength. That means easier handling and fewer breakages — even the largest section is easily carried in one hand.

Test its EASE OF APPLICATION

Undoubtedly, NEWTHERM is one of the easiest of materials to apply. It is supplied in plastic form and in a wide range of standard-sized sections and slabs, smoothly finished and straight edged for immediate fitting. The finished job is very neat, with minimum joints, and appliers particularly appreciate the handleability of the material — especially in difficult situations.

READ ALL ABOUT NEWTHERM

in a specially prepared booklet. Sizes, compressive strength, thermal conductivity, — this and much more useful information can be on file if you write for your copy now, to the sole manufacturers Newalls Insulation Co. Ltd.

NEWALLS (Reg'd Brand)

***NEWTHERM** calcium silicate insulation*

. . . for temperatures up to 1400°F.

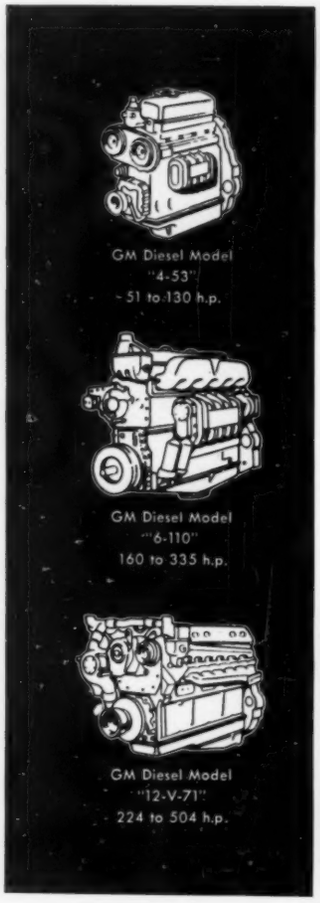
NEWALLS INSULATION CO. LTD.

Head Office: WASHINGTON, CO. DURHAM, ENGLAND.

A member of the TURNER & NEWALL ORGANISATION

Offices & Depots at LONDON, GLASGOW, MANCHESTER, NEWCASTLE UPON TYNE, BIRMINGHAM, BELFAST, DUBLIN, BRISTOL & CARDIFF.

Agents and Vendors in most markets abroad.



Get all the benefits of engine standardization with GM Diesel power!

General Motors has rounded out its all-purpose power line of GM Diesels—from 20 to 1650-h.p. in only 3 cylinder sizes—to fit any type of equipment. Whatever equipment you need, standardize on the finest power available—GM Diesel power.

Whether it's powering a 15-kw. generator, a 300-h.p. drawworks, a 500-h.p. mud pump or a 1,000-h.p. crewboat, there's a GM Diesel to fit the precise need. And because of their unmatched interchangeability, GM Diesel parts that fit a 20-h.p. Diesel also fit a 1650-h.p. GM Diesel. As a result, Oil Men need only keep a minimum stock of parts on hand at all times. And a mechanic who can service one GM Diesel, can service *all* of them, without additional training.

GM Diesel power is compact, light in weight, high in efficiency, durable, inexpensive to maintain, and lowest in parts costs. The wide range of GM Diesel In-Line and "V" Engines permits the greatest flexibility in choice of power for every job. These engines combine every profit-making, cost-saving advantage any Diesel ever had. Call your General Motors representative for a free power consultation.

GENERAL MOTORS OVERSEAS OPERATIONS

DIVISION OF GENERAL MOTORS CORPORATION, 1775 BROADWAY, NEW YORK 19, N.Y., U.S.A.

GM GENERAL MOTORS DIESEL POWER

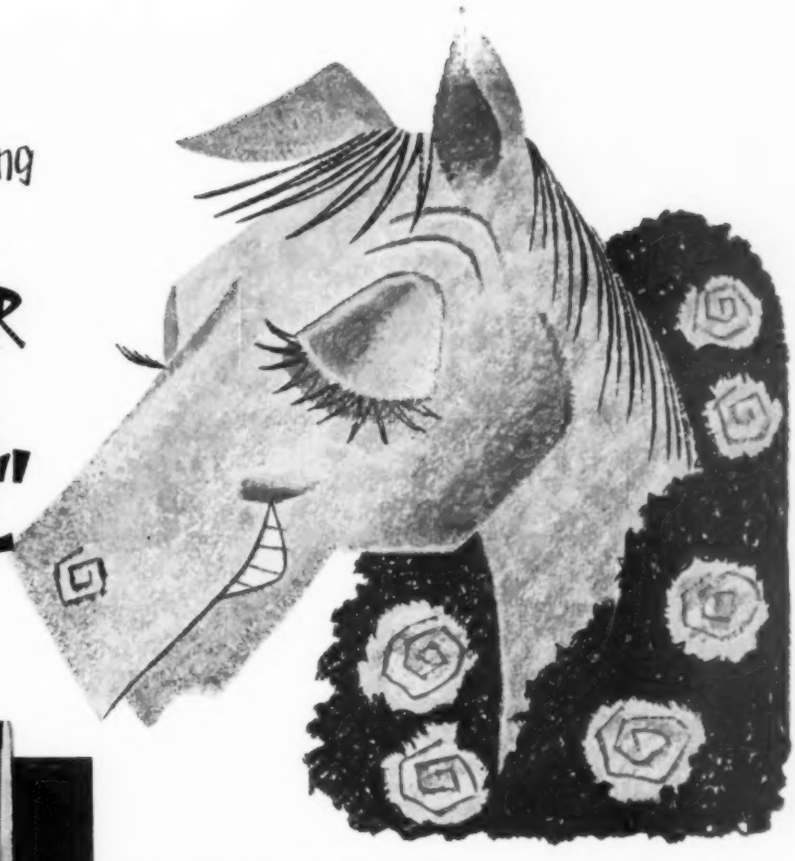
FOR ADDITIONAL DETAILS, CONTACT THE GMOO REPRESENTATIVE NEAREST YOU.

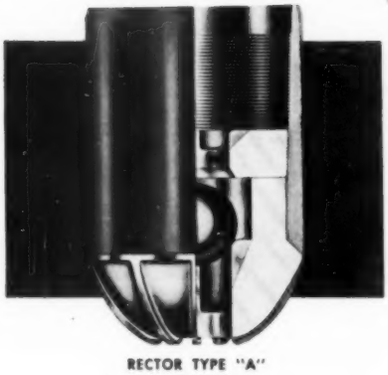
ARGENTINA, Buenos Aires **AUSTRALIA,** Melbourne **BELGIUM,** Antwerp **BRAZIL,** São Paulo **DENMARK,** Copenhagen N.
ENGLAND, London, S. W. 1 **FRANCE,** Paris **GERMANY,** Russelsheim/Main **MEXICO,** Mexico, D. F.
NEW ZEALAND, Wellington **PAKISTAN,** Karachi **PERU,** Lima **PORTUGAL,** Lisbon **SOUTH AFRICA,** Port Elizabeth
SWEDEN, Stockholm 20 **SWITZERLAND,** Bienne **URUGUAY,** Montevideo **VENEZUELA,** Caracas

GENERAL MOTORS LOCOMOTIVES

"for a sure thing in cementing...

PUT YOUR MONEY ON THE NOSE"





RECTOR TYPE "A" FLOAT SHOE

Precision machined from seamless steel tubing. Internal parts are high-strength, drillable aluminum alloy. Moulded rubber-covered float ball insures positive seating.

DRILLABLE ALUMINUM NOSE MAKES RECTOR TYPE "A" CEMENTING EQUIPMENT A WINNER EVERY TIME

The ribbed aluminum guide nose on RECTOR'S Type "A" float shoe is your best bet for getting pipe safely "on bottom" every time. Made from a special aluminum alloy, developed by RECTOR, it provides far greater impact, compression, tensile and shear strength than either concrete or bakelite. RECTOR'S aluminum guide nose guides the cementing shoe past ledges, bridges and other obstructions without danger of breaking. On completion, the aluminum alloy can be drilled out easily, and because there is less material to drill out, it drills out faster.

This superior feature is yours at no extra cost . . . So, for dependability, and exacting performance in all cementing operations, put your money on a sure winner. Specify RECTOR Type "A" cementing equipment from your favorite supply store or see your RECTOR representative.

30 YEARS

Rector

Well Equipment Co., Inc.

Making the Oil Industry Safer!

1100 North Commerce, Fort Worth, Texas Houston Plant: 2215 Commerce Street

EXPORT REPRESENTATIVES: Continental-Emsco Co., Mid-Continent Supply Co., Oilwell Division of United States Steel Corporation

PESA

MONOGRAMMED EQUIPMENT CERTIFICATE NO. 2158

VENEZUELA—Participation of the Government in the Value of Petroleum, 1917-59

Year	Price $ Per Barrel	Price Bolivares Per Barrel	Value of Production[1] (Thousands of Bolivares[3])	Participation[2]	Percentage Participation
1917	2.00	6.46	783	163	20.82
1929	1.88	6.09	829.249	50.544	6.10
1939	0.77	2.48	968.073	106.827	11.04
1944	1.00	3.24	1,088.255	205.480	18.88
1945	1.01	3.27	1,043.256	282.458	27.07
1949	2.43	7.86	3,416.852	1,262.380	36.95
1950	2.22	7.17	3,922.234	1,021.230	26.04
1958	2.60	8.42	8,002.415	2,978.640	37.22
1959	2.52	8.16	8,249.200	3,008.390	36.47

[1]These figures are derived from the average export prices as declared to the customs service multiplied by the corresponding production for the year.

[2]The column represents total taxes (excluding occasional or irregular payments) adjusted to correspond to accruals.

[3]3.09 bolivares = one dollar.

Source: 1917-37—Manuel R. Egana, **Three Decades of Petroleum Production** (Caracas, Venezuela, 1947); 1938-59 Minister of Mines and Hydrocarbons.

VENEZUELA—Oil Taxes and the Budget
(Thousands of Bolivares[2])

Year	Budget Receipts	Total Taxes	%
1917	63.763	163	0.26
1918	50.172	693	1.38
1923	89.398	3.783	4.23
1924	112.164	5.914	5.27
1925	148.474	20.866	14.05
1932	175.366	45.145	25.74
1933	169.643	44.781	26.40
1934	178.666	52.046	29.13
1935	206.376	59.297	28.73
1944	541.878	269.388	49.71
1953	2,533.580	1,589.067	62.72
1954	2,631.800	1,497.903	56.92
1955	2,992.080	1,714.294	57.29
1956	4,374.650	3,108.311[1]	71.05
1957	5,396.610	3,821.816[1]	70.82
1958	4,684.540	2,713.007	57.91
1959	5,733.770	3,225.022	56.25

[1]Includes bonus payments for royalties.
[2]3.09 bolivares = one US dollar.

VENEZUELA—Percentage Distribution of Petroleum Taxes, 1938-59

Year	Royalty	Surface Tax	Income Tax	Customs	Others	Total Taxes[1]
1938	59.55	13.73	——	22.84	3.88	100
1957	56.23	1.18	34.74	3.77	4.08	100
1958	48.94	1.18	44.19	2.80	2.89	100
1959	49.72	1.00	45.43	1.52	2.33	100

[1]Excludes occasional taxes such as the initial exploitation and exploration tax.

VENEZUELA—Oil-Industry Profits and Governmental and Labor Income

Year	Industry Net Profit (Thousands of Bolivares)	Average Worker Income (Bolivares)	Government Oil Income (Thousands of Bolivares)
1949	704.46	12,377	——
1950	969.94	21,878	1,019
1951	1,200.93	27,594	1,411
1952	1,262.53	27,988	1,508
1953	1,261.40	28,164	1,549
1954	1,412.12	32,593	1,520
1955	1,710.26	39,912	1,714
1956	2,114.68	47,978	3,036
1957	2,773.51	60,753	3,822
1958	1,616.26	36,142	2,667
1959	1,335.28	30,791	3,224

Source: M.M.H., Pet. Economic Division, Finance Dept.

hours for office employees. Shifting of the burden of social services to the government did not materialize. Instead, the companies have agreed to provide social services, including new hospitalization facilities in the western fields.

Prorationing: Venezuela has issued a number of statements favoring international prorationing, of limiting of production. An expert from the United States was engaged by the Ministry of Mines and Hydrocarbons, and advised the government for a time—although no results of his visit have been visible.

Venezuela is actively pushing international prorationing, and the views of the oil minister, Sr. Perez, have been widely publicized. Middle East oil has made steady inroads into Venezuelan markets, especially with the existing price advantage of over $1.00 per barrel. Price stabilization, and freezing of markets, would be to Venezuela's distinct advantage, in that they would tend to restrain Middle East incursions into Venezuelan markets.

A meeting of OPEC (Organization of Petroleum Exporting Countries) was held in January 1961 in Caracas. Resolutions of the meeting were not available as this edition went to press.

A new **constitution** is being formulated, according to unofficial Caracas sources. Its impact on oil regulation will undoubtedly be felt, but exact provision are not as yet known. END

VENEZUELA—Drilling, 1954-1960

Year	Total Wells Drilled
1954	836
1955	1,163
1956	1,449
1957	1,746
1958	1,195
1959	707
1960	410*

*Partly estimated.

URUGUAY

EXPLORATION: No exploration is known to have occurred during 1960. The government's petroleum monopoly, ANGAP, was reported in the press to be considering opening the country to international bids for exploration, but this has not been confirmed. No indication of the terms which would be asked has been received.

PRODUCTION, REFINING, MARKETING: There is no production of oil in the country, and only one refinery, a 28,000 b/d plant owned by ANCAP. During 1959 (last available figures) 8,300,000 bbl of crude were imported, of which 5,881,000 came from Venezuela, 2,289,000 from the Soviet Union, and 130,000 bbl from The Netherlands West Indies. Uruguay also imported 2,673,000 bbl of lubricating oil, of which 1,281,000 was from the USA, and the rest from Italy, NWI, France, Argentina, England, and Holland.

Imports of fuel oil amounted to 1,643,000 bbl—696,000 from the Soviet Union, 454,000 from NWI, 390,000 from Venezuela, and 103,000 bbl from Brazil. Gas-oil imports were 582,000 bbl from the Soviet Union, and 57,000 from NWI. Diesel-oil imports were 101,000 from NWI, and 32,000 from Venezuela. Motorfuel imports were 113,000 bbl—86,000 from the Soviet Union and 27,000 from Argentina.

Uruguay imported 92,000 bbl of lubricating greases in 1959—52,000 from the United States, 36,000 from England; and 4,000 from France. Kerosine imports were 72,000 bbl—all from USSR. Avgas imports were 56,000 bbl—all from NWI.

URUGUAY—Imports and Exports, 1959
(Thousands of Barrels)

	Crude Oil	Gasoline Aviation	Gasoline Motor	Kerosine	Gas Oil	Diesel Oil	Fuel Oil	Lubricants	Total
IMPORTS									
United States	—	—	—	—	—	—	—	32	32
Argentina	—	—	27	—	—	—	—	3	30
Brazil	—	—	—	—	—	—	103	—	103
Netherlands Antilles	130	56	—	—	57	101	454	10	808
Venezuela	5,881	—	—	—	—	32	390	—	6,303
France	—	—	—	—	—	—	—	7	7
Italy	—	—	—	—	—	—	—	11	11
United Kingdom	—	—	—	—	—	—	—	3	3
USSR	2,289	—	86	72	582	—	696	—	3,725
Total (1959)	8,300	56	113	72	639	133	1,643	66	11,022
Total (1958)	8,090	187	217	—	362	106	616	37	9,615
EXPORTS[1]									
Undesignated	—	13	27	1	89	148	674	—	952

[1] Over 90% of total exportation is intended for bunkers and for refueling in-transit international air carriers.

Source: American Embassy, Montevideo, through the U. S. Dept. of State.

OIL LAWS

For a statement of oil laws, see *WPR 1960*.

Complete text of Uruguay's oil legislation has been published in a noteworthy collection: "*South America—Basic Oil Laws and Concession Contracts.*" It is a word-for-word compilation of applicable laws, an interesting and useful collection which includes oil regulation for the other countries of South America as well. For information, address the publisher directly: *Petroleum Legislation Ltd., P. O. Box 1591, Grand Central Station, New York 17, N. Y.*

NATIONAL FACTORS

A bill devaluing the Uruguayan currency and discontinuing the multiple exchange system, but providing for levies on certain exports and imports, has been approved by the Chamber of Deputies. The bill abolishes all "official" exchange rates, and rules that foreign-currency values be governed by the free play of supply and demand. END

CENTRAL AMERICA

EXPLORATION: No discoveries were made in Central America (which excludes Mexico), although exploratory activity continued during 1960 and picked up slightly in the first months of 1961. Guatemala was the principal scene of activity, and although some very expensive dry wells were drilled the companies plan to continue their campaign. Cuba reported no discoveries, but had four drilling rigs in operation on January 12, 1961, according to the Cuban Petroleum Institute, and expects to have 12, presumably all of Russian origin, operating by the end of 1961.

PRODUCTION, REFINING, MARKETING: There is substantial production in Trinidad, and small quantities of crude are produced in Cuba. On a net basis the Caribbean is an exporter of petroleum, since local needs are small. No production in the other republics of the area has been established.

OIL LAWS

Drastic modifications took place in the oil law structure of Cuba, but in no other Central American country. The expected new oil law of Panama did not materialize, but was under consideration at the year's end.

The oil laws of Central America have been translated and summarized in an unusual series of volumes which are highly recommended. Information on the oil regulation and on these translations may be obtained directly from its publisher, *Petroleum Legislation Ltd., Post Office Box 1591, Grand Central Station, New York 17, New York.*

NATIONAL FACTORS

An extensive survey of petroleum taxation in each of the Central American countries was completed in 1960 and scheduled for publication sometime in 1961. It reviews taxation in each of the phases of petroleum activity, including exploration, production, transportation, marketing and refining. The publication is entitled *"International Taxation Series."* Inquiries concerning it will be answered by the publisher, at *Post Office Box 2744, Grand Central Station, New York 17, New York.* END

BAHAMA ISLANDS

EXPLORATION: There is no exploration going on at present. The abandonment of the Cay Sal well by Gulf and Standard Oil of California in 1959 effectively shut off interest in the Bahamas which had been stimulated momentarily by the Suez crisis.

PRODUCTION, REFINING, MARKETING: There is no production or refining in the Bahamas. The very small oil requirements there are supplied by imports.

OIL LAWS

The government of the Bahamas has cooperated in preparation of an accurate summary of the oil laws. It is contained in *Petroleum Legislation,* a legislative reference work for oil that is contained in several volumes and also covers all other countries of the world. Its oil legal review is compiled by law firms and government officials within the Bahamas and the same firms keep their reviews up to date by loose-leaf revision service. Inquiries regarding this excellent service should be addressed to the publisher directly as follows: *Petroleum Legislation Ltd., Post Office Box 1591, Grand Central Station, New York 17, New York.*

NATIONAL FACTORS

For a review of the various factors affecting investment see World Petroleum Report 1960, page 27. The most unusual aspect is the complete absence of any taxation on income or dividends. END

BARBADOS

Oil activities have been very limited during the past two years; and for a more extensive review, reference is made to previous editions of *World Petroleum Report,* particularly the 1960 edition, and the April 1959 edition of *World Petroleum.*

EXPLORATION: Barbados Gulf Oil Co. has discontinued exploration activity on the island. Gulf's single gas condensate well, Spring Vale 1, has been assigned to the government-owned natural-gas company. The well is producing into the local distribution system.

The concession formerly held by Gulf is now held by an individual in New York.

REFINING: Mobil International acquired in 1960 a minority interest in Barbados Union Oil Co., a local refining and marketing company. A small refinery at Bridgetown will be expanded to 1,000 b/d.

OIL LAWS

For a review of Barbados oil law, see *Petroleum Legislation.* The review contained therein covers all aspects of Barbados oil regulation.

During 1959 important taxation legislation was passed affecting oil. For a study of this tax regulation—including also all other taxes which affect oil exploration, production, refining, and/or marketing—reference is made to a new study published in 1961, *International Taxation Series.* This series, compiled by oil firms marketing and formerly exploring within the country, is highly recommended as the only study of its kind. For information on *International Taxation Series,* which covers most other countries of the world as well as Barbados, inquiry should be made directly to its publisher at *P. O. Box 1591, Grand Central Station, New York 17, N. Y.* END

NETHERLANDS WEST INDIES

The six islands comprising the Netherlands West Indies have two of the world's large refineries, owned by Lago Oil and Transport Co., affiliate of Standard Oil Co. (New Jersey), and N. V. Curacaosche Petroleum Industrie Mij., affiliate of Shell Group. They have a total crude charging capacity of 650,000 b/d, divided into 210,000 b/d for the Shell and 440,000 b/d for the Standard plants.

The refineries are running at about capacity, but no addition to the plants is underway, since the Venezuelan government's efforts to increase the amount of Venezuelan crude refined in Venezuela have slowed expansion.

Shell has continued to "streamline" its operations, cutting back by 1,200 employees during 1959 and more in 1960 as automation takes over. The employment afforded by the refineries is just about all there is to the economic life of the islands, and the situation has the government very worried. Shell has also terminated its connections with many of the investment companies, selling its formerly wholly owned Curacao Dock Co., Inc. Ltd. to a group which includes Pletterij-Nederhorst Combination Inc. Ltd. of Willemstad; Dock and Warf Co. Wilson-Fijencord Inc., Ltd. in Schiedam; and Netherlands Dock and Shipbuilding Co. of Amsterdam. Thus Shell-Curacao is out of the petroleum shipping and dock business in Curacao.

Few additions have been made to the two large refineries lately, since the companies wish to avoid added investment.

HAITI

No exploration is known to have been performed in Haiti during 1960, although several companies continue to hold concessions. A number of wells have been drilled in the past (See WPR 1960, page 31, for a review of same) and a dry hole, Cul de Sac 1, was drilled to 3,772 ft and abandoned dry in February 1959. Commonwealth Oil Co. was the operator.

There is no refining or production in the country. Consumption is estimated to average around 2,000 b/d, all imported.

OIL LAWS

For a review of oil laws see WPR 1957, page 106. A draft petroleum law has been proposed but no information on it can be obtained despite repeated inquiries. The government situation is evidently too confused to permit passage of such legislation at this time. END

BRITISH HONDURAS

EXPLORATION: Exploration slowed down in 1960. The only company now doing exploratory work is Phillips Petroleum Co., which drilled two dry wildcats in 1959 (see WPR 1960) and was to start a third during late 1960. Sinclair/British Petroleum did some seismic work and withdrew from the country, giving up their exploratory licenses in May, 1960. Drilling by Shell and Gulf has been halted also. For a concession map see WPR 1960.

REFINING AND MAKETING: There is no refining (or production) in the country. Esso decided in 1960 to build an oil storage terminal at Belize, British Honduras, and has it in operation. The facility accommodates deep-water tankers. A barge carries oil products from Tela to a small storage facility five miles up the Belize River. The barge and tug are owned by Esso, but the storage facility by Shell. In the future, tankers will unload part of the products at Tela and the rest at Belize.

BRITISH HONDURAS—IMPORTS AND RE-EXPORTS, 1959
(Thousand barrels)

	Gasoline	Kerosine	Diesel and other fuel oils	Lubricating oil	Asphalt	Total
IMPORTS:						
United States	5	1	9	4	—	19
Guatemala	—	—	2	—	—	2
Trinidad	48	23	25	—	2	98
Total	53	24	36	4	2	119
RE-EXPORTS:						
Total	1	—	2	—	—	3
Bunkers	5	—	1	—	—	6

Source: "Trade Report" 1959, Belize, through the U. S. Department of State

OIL LAWS

For a citation of applicable laws see *World Petroleum Report 1960,* page 28. For a summary of these laws, compiled by government and industry representatives within the country, recommendation is made of *Petroleum Legislation,* a reference service which covers the entire world, including British Honduras. It has a separate summary and analysis of the oil laws of each country. Information concerning it is available through the publisher, *Petroleum Legislation Ltd., Post Office Box 1591, Grand Central Station, New York 17, New York.*

NATIONAL FACTORS

The investment climate is generally favorable. For a review of the various factors affecting investment, see *World Petroleum Report—1957,* page 60. The factors listed there are unchanged. END

COSTA RICA

There is no production or refining in the country. The only concession holder is the Union-Gulf company. For a review of activities in previous years, and maps of the concession, see WORLD PETROLEUM REPORT *1957, 1958,* and *1960.* There were three dry wildcats drilled in 1959 and early 1960 by Gulf Oil Corp. on Union Oil Co. of California's concession. Porvenir 1, located about 12 miles south of Puerto Limon, was abandoned in mid-1959 at a total depth of 6,775 ft. Limon 1, at Puerto Limon, was dry at 10,181 ft early in 1960. The third well, El Tigre 1, 10 miles south of Puerto Viejo, was dry and abandoned at 9,223 ft in June, 1960. All of the tests were located in Limon province. In mid-1960, the partners drilled Telirie 1, located about 30 miles west of Puerto Viejo, also presumably dry.

Union Oil Co. has relinquished rights in Guanacasto province, and was to decide in 1960 on areas to be surrendered in Limon province.

OIL LAWS

The oil regulation of Costa Rica (See *WPR 1957,* p. 74) does not include a petroleum law; however, a draft law has been under consideration for several years. In response to a query of May 1960, Dr. Cesar Dondoli, chief of the geological department, Ministry of Agriculture and Industry, stated that, in the absence of a law, applications for concessions would be considered under the following conditions: (a) an application for contract must be sent to the Ministry of Agriculture and Industry through the Minister; (b) The Minister will study the bid jointly with the geological department, and will sign the contract, if approved; (c) the contract will be published in the *Official Gazette,* and must be approved by the Chamber of Deputies; (d) after such approval, the contract will be sent to the president of the republic for signature into law. These contracts are to be known as Contratos Ley (contracts at law), and may not be changed in any way except through direct negotiation between the parties.

The terms of the Union contract offer the best indication of terms. For the text of the contract, in English translation, the editor recommends *Petroleum Legislation.* This is a legislative reference service containing a summary and analysis of the oil laws and other industry regulation for every major country of the world. The national sections are prepared by legal counsel recommended by oil companies who have actually operated within the country concerned. The same oil-law firms keep their reviews up-to-date by loose-leaf revision service. For information on this excellent service, the publisher may be contacted directly at: *Petroleum Legislation Ltd., P. O. Box 1591, Grand Central Station, New York 17, N. Y.* END

CUBA

During 1960, the process begun by Law 653 of November 23, 1959, was completed with the virtual extinction of private operations in oil—not only in exploration, but in all other industry phases as well. Operations have become a virtual monopoly under the Cuban Petroleum Institute, with crude supplied by Russia for the "intervened" refineries in the country. For a review of the conditions which led to this situation, see the Cuban section of *World Petroleum Report 1960.*

EXPLORATION AND PRODUCTION: Exploration by private companies has ceased almost entirely under the impact of the new laws passed by the Castro administration. However, Soviet geologists have evidently surveyed some of the country, and during October 1960 they issued a report to the effect that oil could be found in the coastal parts of Cuba, adding that "rapacious exploitation of the beds by North American monopolies" have "greatly damaged the oil." Unfortunately for the "monopolists," no oil was ever found to damage during an expensive search of Cuba's offshore possibilities.

The government's Cuban Petroleum Institute is drilling a well at present, reportedly near the Jatibonico field. A recent announcement stated 14 Russian turbodrills would be made available in 1961 for exploration. Since Cuban geology is extremely complex and most prospects have already been tested, it will be surprising if the Russian efforts are successful.

Production in Cuba has declined steadily, and at present is less than 200 b/d. Most of this production comes from Jatibonico. Other established producing areas (now in production) total five; they include Jarahueca field (discovered in 1943), Motembo (discovered about 1880), Cruz Verde, Santa Maria, and Guanabo.

REFINING AND TRANSPORTATION: There is no pipeline network of importance, and almost all crude used is imported.

There are six refineries in Cuba, totaling about 88,200 b/d in crude charging capacity. Only three are of importance. Texaco Inc. had a 20,000 b/d plant at Santiago with 3,000 b/d catalytic capacity. Esso Standard Oil Co. had a 36,500 b/d plant with 24,000 catalytic capacity at Belot (on the outskirts of Havana), and Cia. Petrolera (Shell) had a 28,500 b/d plant only a stone's throw from the Esso plant. All three of these plants have been "intervened," a process which evidently means the companies' refineries will be operated by Cubans from now on, and is tantamount to nationalization.

The intervention was preceded by an order from the government to the companies requiring use of Russian crude in their refineries. The 1938 basic petroleum law requires "government crude" to be run in national refineries, but the companies contend this applies only

to Cuban-produced oil. Texaco was especially vehement on this point, since it built its refinery under terms of Law-Decree 1758 of November 2, 1954, which repealed all other laws in conflict with it, and provided that Texaco's refinery was to be governed by its provisions.

The goverment now runs the plants through "administrators." Reportedly, the plants are operating at only partial capacity due to lack of spare parts. The Esso plant at Belot (Havana's outskirts) has been renamed the "Nic Lobpez" plant, and the Texaco plant at Santiago the "Hermanos Diaz" refinery, the names coming from dead members of the revolution.

Standard Oil Co. (New Jersey), owner of the Esso refinery, told tanker owners and brokers in 1960 that, in regard to future commitments, it and its affiliates "will take into consideration whether tanker owners are now chartering or selling tankers to the Russians for any trade, and will also take into consideration in the future which ship brokers are dealing in tankers for the transport of Russian Black Sea oil." The statement was an expression of feelings rather than as official company policy, but there was little doubt that the purpose was to put at least a partial stop to shipments to Cuba.

MARKETING: Cuba's consumption was about 65,000 b/d in 1959, but is estimated to have dropped by about 25% during 1960 due to the restrictions on business. There is reportedly an oil shortage, but exactly how much Russian crude is being shipped in and run is not known. Industry reports say that increasing amounts of products are being brought in from Russia instead of crude, since Cuban technicians are having difficulty operating the intervened refineries. The three very small refineries, in addition to the intervened ones, are being used, but their total throughput is only around 3,400 b/d.

OIL LAWS

Basic petroleum regulation in Cuba may be divided into two parts; the first dealing with legislation as it existed before October 1959; the second with legislation after that date.

Basic controlling legislation in the first period includes: the 1940 Constitution; the Law of Combustible Minerals (an equivalent translation is "Mineral Fuel Law") of May 9, 1938 (as amended); Presidential Decree 2625 of October 16, 1939 (as amended), dealing with regulations to the Law of Combustible Minerals; and Law-Decree 1526 of July 8, 1954, known as "Law-Decree for the Stimulation of the Mining of Petroleum and Other Hydrocarbons," which amended the Combustible Minerals Law to encourage petroleum development by special economic and financial incentives for a period of five years, extended by Resolution Law 40 to July 27, 1962. Law-Decree 1758 of November 2, 1954, and its Regulations, Decree 3862 of November 20, 1955, extended benefits to new or enlarged refineries for a period of not less than 20 years. This law is covered in the final section of this report.

Legislation in the second period began in October 1959, and revised the entire structure of Cuban regulation for oil. Principal laws are as follows:

Law No. 608 of October 27, 1959 (*Extraordinary Official Gazette No. 49* of same date): Deals with the seizure of exploration and technical information from the files of the oil companies.

Law 653 of November 23, 1959 (*Official Gazette 222* of November 23, 1959) which sets 60% royalty, derogates Decree-Law 1526 of July 8, 1954, and its extending Agreement Law 40 of July 8, 1958, which were designed to stimulate exploration. This law 653 drastically alters but continues the basic petroleum law of May 9, 1938. It is the basic oil legislation at present in Cuba, together with its regulations contained in Law 866 of August 17, 1960.

Law 653 requires payment of 60% in cash or kind, at the option of the government, to whom it is paid, on all the production of crude, petroleum, naphtha, and natural gas, with the government reserving the rights to buy all production. The Cuban Petroleum Institute is created within the Industrialization Department of the National Institution for Agrarian Reform with wide power to regulate exploration, exploitation, refining, transportation, distribution, and sale of petroleum and its derivatives and of fuels produced in Cuba. The Ministry of Agriculture is empowered to fix annual quotas for production by each refinery. Exploration concessionaires may request two years' extension to continue work, provided no concession exceeds 8,000 hectares. Any concession transfers hereafter require prior government approval. Full reports on exploration and exploitation activities are required monthly. The determined obligation of drilling shall cease only when the maximum productivity, advisable to prevent the rapid exhaustion of the deposit, has been reached.

Order No. 1838/1960 of February 1, 1960 (not published in the *Official Gazette*, but distributed by mail to the different Cuban customhouses at port and airport): This order is signed by the director of Havana customs, and repeats instructions issued December 1959 by by the general-director of customs, Treasury Department, forbidding any authorization of permission for re-exportation of machinery, equipment, accessories, or any other tool pertaining to the petroleum industry.

Resolution No. 135 January 30, 1960 (*Official Gazette* of February 8, 1960): This is a resolution of the National Institute of Agrarian Reform (INRA), and delegates powers in the chief of the Industrialization Department to handle mining and petroleum financing matters, referring credits negotiated with the new Cuban Bank of Exterior Commerce, for the development and marketing of mineral.

Resolution No. 147 of March 18, 1960 (*Official Gazette* of April 28, 1960): This resolution is by the National Institute of Agrarian Reform (INRA), and designates the Mexican engineer Alfonso Gutierrez as director of the Institute of Cuban Petroleum (ICP) giving him special and broad managing and disposition powers.

Law No. 768 of March 24, 1960 (*Official Gazette No. 60* of March 28, 1960): Regulates the functions and means of the Department of Mines and Petroleum attached to the Ministry of Agriculture.

Resolution No. 146 of April 5, 1960 (*Official Gazette* of April 20, 1960): Whereby the Commerce Department regulates the distribution of molasses from the Cuban sugar crop between the different Cuban distilleries, in order to produce gasoline mixed with alcohol.

Resolution of May 12, 1960 (*Official Gazette* of May 25, 1960) of the Treasury Department, authorizing the extraction and disposal of crudes imported by the Institute of Cuban Petroleum (ICP) without performance bonds or cash deposits to guarantee custom, duties, taxes, etc.

Resolution No. 214 of May 17, 1960 (*Official Gazette* of May 25, 1960) of the Commerce Department, regulating the official price for gasoline, kerosine, and gas oil; fixing certain prices in the different Cuban provinces; and regulating wholesale prices, distribution prices, and public prices.

Law No. 817 of May 20, 1960 (*Official Gazette* of May 24, 1960), which declares void the agreement signed between the oil importers and oil refineries and their distributors and filing statements, in order to give opportunity to other refineries (ICP) to sell their productions and subproductions in the Cuban market.

Resolution No. 188 of June 28, 1960 (published in the newspapers on June 29 and 30): This resolution by INRA instructs the Texaco Co. (West Indies Ltd.) to refine the petroleum of the Cuban government imported from Russia, or suffer intervention of the refinery by officers of the ICP (Institute of Cuban Petroleum).

Resolution 189 of 30 June 1960: This resolution by the executive power instructs Shell de Cuba SA to refine petroleum of the Cuban government imported from Russia or suffer intervention of the refinery by officers of the ICP (Institute of Cuban Petroleum).

Resolution 32 of July 1, 1960: This resolution by the director-general of the Cuban Petroleum Institute carries out intervention of the Shell de Cuba SA refinery, and appoints an intervenor.

Resolution of June 29, 1960, carrying out intervention of the Texaco Inc. refinery and appointing an intervenor.

Organic Law of the Cuban Petroleum Institute, Law 866 of August 17, 1960 (*Official Gazette Extraordinary Edition No. 18*, August 17, 1960) containing regulations for the Cuban Petroleum Institute as established by Law 635 and defining its functions and powers. The "whereas" clauses of the Organic Law are more restrained than those of Law 635, and they stress the need to hasten the country's economic and industrial development; to improve considerably the living conditions of the Cuban people; to save foreign exchange; to become self-sufficient, if possible, in petroleum; to improve the distribution of petroleum products and to "have available the liquid fuel necessary to meet the strategic military requirements which will allow it autonomy in the event of international conflicts." The Organic Law quite clearly places all activities related to petroleum within the purview of the Cuban Petroleum Institute, the functions and powers of which are set forth in some detail. In exercising its powers, however, the Institute's plans are subject to the prior approval of the National Planning Board. The Cuban Petroleum Institute is required to pay all applicable taxes, except on business profits. Such profits must be deposited as public revenue in the general treasury of the republic. Law 866 is quite similar to Law 867, which established the Cuban Mining Institute (Dispatch 580, September 12, 1960).

For a detailed study of petroleum-industry legislation and regulation within Cuba, the editor highly recommends *Petroleum Legislation*.

This is a legislative reference service containing a summary and analysis of the oil laws and other industry regulation for every major country of the world. The national sections are prepared by legal counsel recommended by oil companies who have actually operated within the country concerned. The same oil-law firms keep their reviews up-to-date by loose-leaf revision service. For information on this excellent service, the publisher may be contacted directly at: *Petroleum Legislation Ltd., P. O. Box 1591, Grand Central Station, New York 17, N. Y.*

NATIONAL FACTORS

Political orientation of the Castro régime has tended progressively more toward the Communist Bloc. The hostile attitude toward USA investment has, in turn, built resentment within the United States and brought a cut in the Cuban sugar quota by the USA which has complicated the balance-of-payments problem. The agreement for sale of one million tons of sugar to Russia each year for five years helped to solve the surplus presently existing within Cuba, but exchange restrictions and lack of confidence in the peso have reduced its value to about 39 cents per US dollar (black-market rate) from its former parity with the dollar.

The Castro administration is faced with a tremendously difficult task. It inherited a weak economy, heavily dependent on a single commodity and on foreign investment. Some $100 million has been received from Russia, $60 million equivalent from a Dutch financial group, and $20 million from Czechoslovakia. The 1960 budget, however, is 600 million pesos, 100 million more than 1959, and the government is pursuing a radical land-reform program with extensive construction under way in housing, likely to weaken the currency further. END

DOMINICAN REPUBLIC

There has been some exploration in the country, but no significant discoveries. During 1960 two exploratory tests were drilled by the principal concession holder, Petrolera Dominicana CA. The first, Kilometer 19-2, was near Azua, 62 miles west of Cuidad Trujillo, and abandoned March 10, 1960 at 10,005 ft in hard, tight limestone. The second, Maleno 1-DT, east of the first well, was presumably dry, but no results have been officially reported. According to Edward Pauley, president, the company already has one well producing a few hundred barrels daily of high-grade oil which is being sold for fuel.

There is no production, refining, or pipeline transportation in the country.

OIL LAWS

Controlling statutes include Law 4532 on exploration and exploitation. That law, plus the concession contracts of Pauley, is available in English in a compilation of oil regulations published during 1960, entitled "*Central America and Caribbean—Basic Oil Laws and Concession Contracts.*" It is a word-for-word compilation of applicable laws, an interesting and useful collection which includes oil regulation for the other countries of Central America and the Caribbean as well. For information inquiries should be addressed directly to the publisher, *Petroleum Legislation Ltd., P. O. Box 1591, Grand Central Station, New York 17, N. Y.*

END

EL SALVADOR

EXPLORATION AND PRODUCTION: During 1960 it was reported in the press that the National Geological Service of El Salvador had concluded a five-year survey and indicated the presence of oil was "extremely unlikely." The head of the Service, Dr. Fritz Durr, by letter of November 22 1960, however, stated that "there has never been a report on petroleum prospects in El Salvador by any governmental institution, nor does a report exist prepared by any private institution."

There are no concessions in the country now, although some companies (not identified) are reported to have applied along the Pacific coast.

REFINING: Three groups have applied for permission to build a refinery. Shell has confirmed it will put in operation within 18 months a $10 million refinery in the Acajutla area of El Salvador. The company should benefit by a 1952 law which grants customs exemptions for both crude and equipment. The contract to build Shell's 10,000 b/d refinery has been granted to the Dutch-based Fluor-Schuitvlot N. V., of Haarlem. Most of the equipment for the $12-million plant at Acajutla will be supplied from Europe.

Esso announced in 1960 its decision to build an $8.5-million plant capable of producing over 8,200 b/d of products. Construction will start in 1961, also at Acajutla.

A third bid for the building of a refinery in El Salvador, already approved, comes from joint USA, British, and local capital. Participants are not known.

MARKETING: Local consumption is about 5,000 b/d.

Reported prices of regular and premium gasoline, as of March 15, 1960, are 50 cents and 54 cents per gallon respectively.

OIL LAWS

A new ruling was issued in 1960 to encourage foreign oil capital to establish refineries. It cuts the requirements for 50% local capital participation to only 5% under the 1952 industrial-development Law.

Word has been received from the government that the draft Mining Law is still in its preliminary stages. A number of changes are to be made before its final passage. El Salvador has no petroleum law; the present Mining Law (dated 1922) is not applicable to oil and provides for special legislative approval of oil contracts. The draft Mining Law will apply to oil, when and if it is passed.

NATIONAL FACTORS

The principal determining factor, the government's attitude toward international investment has not been determined since the bloodless coup that overthrew President Jose Maria Lemus on October 26, 1960 and installed a junta. Press information indicated that Communist and pro-Castro elements form part of the broad front that organized the coup. However, they give the regime a pro-western orientation. END

HONDURAS

EXPLORATION: Two concessions were granted under the 1954 Petroleum Code (See map in WPR-1958, Page 69.) Petroleos Hondurenos, S. A. was granted an 11 million acre concession in Santa Barbara and Olancho in in 1957. Petroleos Hondurenos, an American syndicate, is owned by Felmont Petroleum Corporation, Western Hemisphere Petroleum Corporation, Nafco Oil and Gas Inc., Georesearch, Inc., D. H. Byrd, Tradewinds Explorations, Inc., and Justiss-Mears Oil Co.

Petrolera Hondurena, S. A. was granted 51 million acres in Gracias A. Dios, Colon, Atlantida, Yoro, Cortes, Comayagua, and areas offshore from the North Coast in 1955. Petrolera Hondurena is owned by David C. McCord, International Geophysical Explorations, Inc. and various Honduran interests.

The concessions grant nonexclusive exploration rights for 20 years and exclusive production rights in an unlimited number of 1,235 acre denouncement areas which are regulated according to the Mining Code.

Both of these concessions are in good standing as proclaimed by the Department of Natural Resources, although no new concessions can be obtained until a new petroleum code before Congress has been passed.

Petroleos Hondurenos has completed detailed surface mapping over 1,396 square miles in Santa Barbara, Comayagua, Morazan, and Gracias A. Dios. Over 17,500 feet of combined Jurassic, Cretaceous, and Eocene formations have been measured, named, and correlated with formation in Guatemala, Mexico, and Texas through paleontology. Source and reservoir zones have been found in the Jurassic and Lower Cretaceous. Closed anticlines have been mapped in southern Santa Barbara and northwestern Comayagua. Oil seeps have been found in Comayagua which contain paraffin base crudes. Petroleos plans a deep test on a large structure near Atima in Southwestern Santa Barbara in 1961.

Petrolera Hondurena in 1955 and 1956 conducted a gravity survey over a large area in Gracias A. Dios and subsequent interpretation

has revealed several good anticlinal possibilities. Petrolera drilled one test well near Puerto Lempira in Gracias A. Dios to a total depth of 6,947 feet in 1955 and 1956. The results of the test are not known.

Petrolera plans to drill four test wells in the Taulabe area of Comayagua in 1960 and 1961 on a farmout basis. The Cantarranas (Jurassic) and Atima (Lower Cretaceous) formations will be tested.

Production and Marketing: The marketing demands of Honduras, including the fruit companies, is slightly over 5,000 barrels per day. One refinery was proposed in the Gulf of Fonseca area by a New York group, but approval is lacking from Congress.

OIL LAWS

For a review of the provisions of the presently-existing petroleum law see WORLD PETROLEUM REPORT—1957.

A new petroleum law draft, written by a Peruvian lawyer, is patterned after the Guatemalan Code and is somewhat fussy with complicated regulations and stiff monetary requirements. Upon advice from foreign companies, the Honduran Congress is expected to revise the law before it is passed.

For a detailed study of petroleum industry legislation and regulation within Honduras, the editor highly recommends *Petroleum Legislation*, a legislative reference service containing a summary and analysis of the oil laws and other industry regulations. The sections are prepared by legal counsel recommended by oil companies who have actually operated within the Honduras. The same oil law firm keeps its reviews up to date by loose-leaf revision service. For information on this excellent service, the publisher may be contacted directly at: *Petroleum Legislation Ltd., Post Office Box 1591, Grand Central Station, New York 17, New York.*

NATIONAL FACTORS

Political Trends: Honduras in 1960 is stable and the regime under Dr. Ramon Villeda Morales has nearly complete control of all political activity, The police revolt led by Colonel Velasquez in July, 1959 was not Communist inspired, but rather a power struggle among nationals. The revolt failed and served only to strengthen the Morales government. President Morales in a trip to Miami and New Orleans in June, 1960 stated categorically that he welcomes American capital to Honduras.

Although communist agents can be found in Honduras, their influence is probably less than in any other Central American country. The Morales government, being a freely and fairly elected body, has the complete backing of the U. S. State Department. END

NICARAGUA

EXPLORATION: There is no exploration going forward in the country at present. Occidental Petroleum Corp. has given up its concessions and pulled out of the country.

International Oil Participants Corp. will soon send a team to Nicaragua to consider starting oil exploration near Lake Nicaragua, according to reports. The group consists of Joseph W. Frazer, former president of Kaiser-Frazer; George C. Sheahan, vice-president of Sunset Petroleum International; Hernando Ramirez, executive director of the Latin American Chamber of Commerce; Clive F. Webster, vice-president of the IOPC; and Joseph A. Jones, ex-president of American News Service. The firm, if it goes ahead, would be the only one engaged in exploration. No work was done in 1960 following May, when Henry Raasveldt of Empire Resources Co. of New York, N. Y., left.

Applications have also reportedly been made by George Greene of Texas to explore for oil on 500,000 acres and the Cia Central Nicaraguense de Petroleo y Gas, S. A., for 1,000,000 acres.

PRODUCTION AND TRANSPORTATION: There is no production in the country, nor pipelines.

REFINING: Esso, an affiliate of Standard Oil Co. (New Jersey) has applied for permission to build a $10 million refinery at Corinto, the most important port of the west coast of the Republic, No word on approval of the plan has been received. Shell also has presented a request for refinery construction, according to press reports.

MARKETING: Needs are small, about 3,000 b/d, and the refineries contemplated would process primarily for export.

OIL LAWS

Oil is subject to Decree 372 of 1958. For a detailed and highly recommended study of this decree and other petroleum industry legislation within Nicaragua, the editor highly recommends *Petroleum Legislation*, a legislative reference service containing a summary and analysis of the oil laws and other industry regulation for every major country of the world. The national sections are prepared by oil companies who have actually operated within Nicaragua. The same firm keeps its reviews up to date by loose-leaf revision service. For information on this service, the publisher may be contacted directly at: *Petroleum Legislation Ltd., Post Office Box 1591, Grand Central Station, New York 17, New York.*

NATIONAL FACTORS

Extensive legal guarantees exist for international investment. Some of these inducements are summarized in WPR 1957, page 207. The political situation has been generally stable, under Luis Somoza, who succeeded to the presidency following the assassination of his father.

For a review of taxation see World Petroleum Report 1957, page 207. END

JAMAICA

EXPLORATION: Jamaica Time Petroleum, Inc., headed by R. R. Greenbaum of Wichita, Kan., signed an agreement on September 22, 1959 with the Jamaican government for an exclusive exploration concession covering all of Jamaica and its territorial waters, as well as the Pedro Banks and the Morant Cays.

Jamaica Time is allowed 18 months to do geological work in the area before the first of a series of five wells must be commenced. One of these tests must be drilled to 15,000 feet, if possible, but there is a "granite clause" in the agreement. All geological and geophysical information secured by the earlier operators in the country, including sample and electric logs and geophysical surveys, are available to Jamaica Time's geologists, who are now working in the country.

Royalty is 16-2/3%. The term of the mineral leases to be given will be 20 years, with right of renewal for another 20 years. No rentals are payable for the first five years after the acreage is chosen, and thereafter rentals are nominal.

A checkerboard system similar to that of Canada is provided, except that the retained units are larger. Acreage is earned on a graduated scale, with wells drilled below 1,000 feet earning 40,000 acres and those going over 12,000 feet acquiring 80,000 acres. If oil is found above 1,000 feet, the discovery well earns 40,000 acres. Any disputes that may arise are to be settled by impartial arbitration.

PRODUCTION: There is no local petroleum production.

REFINING: Esso Standard Oil (S.A.) agreed during 1959 to build a 26,000 b/d refinery on the island. The company stated in August 1960 that enabling legislation for the new refinery had been passed. No site has been selected yet, and the company is proceeding with engineering and evaluation of sites. This will be Jamaica's first refinery.

MARKETING: Consumption has accelerated in recent years, as the accompanying table will illustrate.

OIL LAWS

For a detailed and highly recommended study of petroleum industry legislation and regulation within Jamaica, the editor highly recommends *Petroleum Legislation*. This is a legislative reference service containing a summary and analysis of the oil laws and other industry regulation for every major country of the world. The national sections are prepared by outstanding legal counsel recommended by oil companies, Manron & Hart, 17 Barry St., Kingston. The same oil law firms keep their reviews up to date by loose-leaf revision service. For information on

JAMAICA—OIL PRODUCT CONSUMPTION

	Gallons 1952	Gallons 1958
Aviation Gas	4,199,793	7,450,647
Motor Gas	14,070,373	24,192,802
Kerosene	3,765,398	9,260,463
Gas Oil	9,716,070	10,145,850
Diesel Oil	6,452,628	20,417,298
Other	38,170,041	106,229,046
TOTALS	76,377,303	177,726,106

this excellent service, the publisher may be contacted directly at: *Petroleum Legislation Ltd., Post Office Box 1591, Grand Central Station, New York 17, New York.*

NATIONAL FACTORS

A number of factors have contributed to Jamaica's favorable investment climate. Recently the Jamaica government successfully issued $12.5 million in bonds on the New York market, the first British colonial territory to float a public loan on the U. S. market.

The country has a number of incentive laws which contribute to the attractiveness as an investment site. They include the following:

1. *The Pioneer Industries (Encouragement) Law*—Grants concessions in the form of relief from import duties and tax relief to any industry which is not already being carried on in Jamaica on a substantial scale.

2. *The Industrial Incentives Law, 1956*—Provides for grants of concessions to any industry if government is satisfied that it will be of benefit to the island, both economic and non-economic consideration being taken into account.

3. *The Export Industry Encouragement Law, 1956*—Grants concessions to industries which manufacture for export only.

4. *The International Business Companies (Exemptions from Income Tax) Law, 1956*—Provides exemption from income tax of international business companies which are not trading locally or in the West Indies (British), British Guiana and British Honduras.

A detailed study of taxation of petroleum in Jamaica has been prepared and will be available during early 1961 under the title of "*International Taxation Series.*" This series is devoted exclusively to petroleum taxation, covering every type of tax imposed on petroleum operations in all countries. Marketing, refining, transportation, exploration and production taxes are covered, with a separate study of each. For an example of one of these national studies (all are prepared in exactly the same format) please refer to the Colombia section of this issue of WORLD PETROLEUM REPORT, that division entitled "Colombia—Petroleum Industry Taxation." Requests for information on the entire series should be addressed to "*International Taxation Series,*" *Post Office Box 2744, Grand Central Station, New York 17, New York.* END

MEXICO

EXPLORATION:[1] Well completions in 1960 totaled 622 holes, as of October 31, 1960. Of this total, 87 were exploratory and 353 were development. Drilling of three exploratory and 290 development wells was done by 14 independent contractors, with 59 rigs. Pemex drilled the rest with 93 rigs in operation.

Independent contractors accounted for two exploratory and 257 productive development wells in 1960. Pemex drilled 15 exploratory and 200 development holes in 1960.

During 1960, three new gas fields were discovered in the Reynosa District (North Zone) and three more in the South Zone (Tabasco). On the "Golden Lane" and vicinity, six new oil fields were located, and four in the South Zone (Tabasco).

Limestone producing formations were found in 1960 by Pemex for the first time in Tabasco. The discovery well, Cerro Nanchital No. 1, tested 302 b/d on a 7/32-in. choke. The productive zone was found between 3,333.5 ft. and 3,356.5 ft. This well may prove an entirely new productive structure along the mountain range overlooking the Tabasco plains. The well was terminated in mid-July; total depth is 3,493 ft.

PRODUCTION: During 1960, Mexico's crude production (not including condensates) averaged 271,247 b/d plus 26,329 b/d of absorption liquids. During 1959, production was 96,393,040 bbl of crude for an average of 264,090 b/d. Condensate and absorption liquids totaled 9,365,431 bbl. This compares with total crude runs to stills during 1959 of 99,042,171 bbl. Official figures for Mexican crude production, not including condensate, during 1960 are given in an accompanying table.

MEXICO—Crude-Oil Production,* 1960
(Barrels of 42 US Gallons)

January	261,262
February	261,777
March	270,176
April	251,503
May	263,803
June	275,377
July	279,782
August	288,656
September	287,582
October	267,470
November	267,095
December	270,250 (est.)
Year 1960	271,243 b/d

*Exclusive of condensate.

Pemex chief Gutiérrez Roldán stated, March 18, 1960, that petroleum reserves, including the petroleum equivalent of gas, totaled 4,348 billion barrels as of January 1, 1960.

REFINING: Total crude capacity, as of December 1960, was 401,000 b/d, attained by additions to the Tampico and Poza Rica refineries as 1960's part of the program which is to reach the 501,000 b/d mark by 1963.

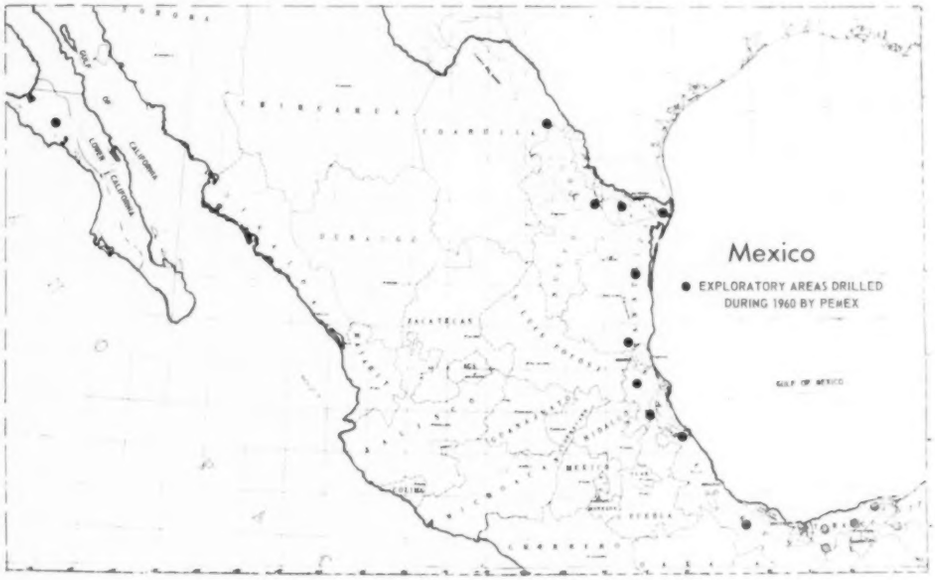
TRANSPORTATION: Two major projects were terminated during 1960: The US $40 million 491-mile gas line from Tabasco fields to Mexico City, which will carry at full capacity 500 million cubic feet of gas daily, is in its testing period; and the US $22 million 220-mile double line (16-in. for gas and 10¾-in. for products), running from Monterrey to Torreon, was completed. The capacity of this gas line is 40 million cubic feet, and that of the products line is 15,000 b/d.

Tennessee Gas Transmission Co., Houston, signed a preliminary agreement with Petroleos Mexicanos for construction of a 1,200-mile natural-gas line of 34 in. from Reynosa, northeast Mexico, to Mexicali, in the west, near the USA border. Tennessee plans to extend this line 200 miles to Los Angeles. Pemex will operate this line as its law requires.

PETROCHEMICALS: The first of two dodecylbenzene plants comprised in Petroleos Mexicanos three-year program has been on-stream at full capacity (14,800 metric tons per year) since late March 1960. Work on 18 other petrochemical plants progressed on schedule during 1960, to permit successive operation of them between mid-1961 and mid-1962. Private investors are being licensed for various processes.

Pemex recently announced, for the first time, the full details of the development plan for the country's petrochemical industry. If the plans are adhered to, the end of 1962 will see in operation some two dozen plants with a combined annual capacity of well over half a million metric tons of hydrocarbon chemicals ranging from aromatics, olefins, and other aliphatic intermediates to man-made fibers and rubber, tetraethyl lead, solvents, nitrogenous fertilizers, and other materials. The manufacture of the primary chemicals by Pemex will be chiefly based on the company's four largest refineries at Azcapotzalco (Mexico City), Madero (Tampico), Minatitlán (Veracruz), and Salamanca

[1] Review by Pemex



MEXICO—Petrochemical Plans

Current Marketable Production	Capacity (Tons Per Year)	Production Centers
Sulfur	57,700	Poza Rica, Azcapotzalco
Dodecylbenzene	14,800	Azcapotzalco
	72,500	
Planned Marketable Production		
Benzene, Toluene, Xylenes, Cumene	136,300	Minatitlan (1961)
Styrene Monomer	10,000	Madero (1962)
Synthetic GR-S Rubber	20,000	Madero (1962)
Polyethylene	20,000	Azcapo. (1962) Madero (a)
Polypropylene	(a)	Madero
Acetaldehyde	23,000	Salamanca (1962)
Vinylchloride	10,000	(a)
Dodecylbenzene	14,800	Madero (1961)
Sulfur	11,500	Madero (1960)
Carbon Black Base Stock	24,000	Salamanca (1961)
Ammonia: For industrial uses	120,150	Salamanca, Minatitlan
For agriculture	79,200	(1961) and Chihuahua
	468,950	

(a) Not stated.

(Guanajuato). The production of aromatic chemicals, the largest group within the organic-chemical sector of Mexico's program, is to be centered at Minatitlán, where the output target for benzene alone is set at no less than 112,500 metric tons per year.

MARKETING: During 1960, sales of Pemex products in the domestic markets are estimated by Pemex at 241,000 b/d of liquid products and 34,000, b/d of gas reduced to oil-equivalent. Forecast for 1961 contemplates a drop in liquid products sales and a rise in natural gas, due to substitution of bunkers and diesel oil made possible by operation of the Tabasco-Mexico City gas line scheduled to begin operation in March 1961. Exportable surplus of residuals will increase accordingly. Estimates for 1961 are as follows: 232,000 b/d liquid products and 60,000 b/d gas reduced to oil-equivalent. During 1960, exports of crudes and bunkers were 7.7 million barrels with a total value of US $11.5 million. Natural-gas exports to the USA totaled 47 billion cubic feet, with total value of about US $7 million.

Estimates of domestic sales are not included (about 35,000 b/d). Neither are Pemex' own consumption, plus oil used in processing.

Pemex Operations in 1959: Wells drilled during 1959 totaled 441 against a target of 477, and against 379 in 1958. Some 278 found oil and 20 gas, while 143 were dry. In 1958, 284 found oil or gas, and 95 were dry. Exploratory wells totaled 133 against 76 in 1958, and 34 found oil and eight gas, while 91 were dry. Average depth of the wells was 7,035 ft against 6,958 ft in 1958.

Production of crude oil, distillate, and natural gasoline rose by 5.4% to 289,749 b/d in 1959. By zones, there were increases for the Northeast District, North District, Tehuantepec, and Tabasco, but decreases for South District, New Golden Lane, Poza Rica, and Papaloapan basin.

Natural-gas production in 1959 was 329,363 million cubic feet, a rise of 25% over 1958, compared with a 1957-to-1958 rise of 62%. Exports to the USA rose by 11.4% to 1,517,323,072 cubic meters.

Crude runs to stills in 1959 came to 266,762 b/d, a gain of 8.9% over 1958. Most of the increase was in lighter crudes: for more gasoline, kerosine, naphtha, distillate, and LPGas. LPG output rose 59%, and lube-oil output by 14.9%; and a start was made on jet-fuel production with output of 66,030 bbl.

Domestic consumption was 270,329 bbl in 1959, a gain of 2.5%, against gain 3.8% and 5.7% in the two prior years.

Exports of crude (all to USA) in 1959 came to 11,627 bbl; export of products (most of it to the USA) came to 13,182,608 bbl.

Imports of crude in 1959 came to 20,996 bbl, and of products to 8,364,691 bbl, a total for both of 13,400,000 in 1958. Almost all of this came from the USA.

OIL LAWS

For a detailed and highly recommended study of petroleum-industry legislation and regulation within Mexico, the editor highly recommends *Petroleum Legislation*. This is a legislative reference service containing a summary and analysis of the oil laws and other industry regulation for every major country of the world. The national sections are prepared by Mexican legal counsel, who keep their reviews up-to-date by loose-leaf revision service. For information on this excellent service, the publisher may be contacted directly at: *Petroleum Legislation Ltd., P. O. Box 1591, Grand Central Station, New York 17, N. Y.*

The long-awaited regulations to the Petroleum Law of November 29, 1958, published in the *Diario Official* of August 25, 1959, gives the Ministry of the National Patrimony all authority and responsibility for supervising the Mexican petroleum industry. The Ministry will reassert State control, through Petroleos Mexicanos, over exploration, exploitation, refining, transportation, and first sale of petroleum and petroleum products.

Regulations also attempt to define the area of petrochemistry reserved for State operation, but products which only the State or its agents may produce are not specifically listed. Decisions as to such products probably will be made administratively.

NATIONAL FACTORS

No relaxation of the government's petroleum monopoly appears imminent or even politically possible. Under its new chief, Pascual Gutiérrez Roldán, Pemex has continued to expand, and during 1960 received injections of fresh capital which enabled it to carry out a companywide expansion.

While Pemex has its problems, especially those which plague government-owned enterprises, such as having to supply electricity, road construction, etc., while subject to price ceilings, much has been done. A rise in product prices was made which will enable Pemex to increase its earnings as well.

Pemex also has reached an important understanding with the government as regards its fiscal obligations. On December 29, 1959, the *Official Gazette (Diario Official)* published the "Revenue Law of the Federal Government for 1960" Ley de Ingresos de la Federación para 1960) under Art. 10. Petróleos Mexicanos is liable to pay from January 1, 1960, a single tax at the rate of 12% calculated on its gross income without any deductions. This single tax has been substituted for all other taxes, rights, contributions, and special encumbrances levied on the operations of Petróleos Mexicanos prior to December 31, 1959.

In this same Art. 10, it is stipulated that, in order to facilitate payment of the new single tax, Petróleos Mexicanos is liable to the Federal Government Revenue Office (Fisco), paying through the Banco de Mexico SA the amount of $2,000,000.00 pesos daily, and that quarterly liquidations will be effected to adjust the actual amounts paid, with the revenue due during each quarter.

The Industry and Commerce Ministry issued a decree in early 1960, requiring special permits for imports of petroleum products either to the interior or to border areas. Northern border cities have been importing large quantities of USA gas and oil.

Six nations of Latin America will "form a bloc to defend a common market," according to Gutiérrez Roldán, head of Petroleos Mexicanos (Pemex), the State oil agency. Contracts were announced in October which call for investment by Argentina's oil agency, YPF, in tetraethyl-lead and synthetic-rubber plants in Mexico. Mexico will invest also in Argentine tetraethyl-lead and petrochemical plants. Bolivia, Peru, Brazil, and Venezuela are to be included in the agreement, according to the Pemex head, to form an international consortium to "protect free Latin America from foreign oil monopolies." Both Mexico and Argentina are short of funds, and how their investment is to be financed was not disclosed. Recent reports indicated Pemex plans to explore and exploit in Bolivia, although how this arrangement would work is not clear. END

GUATEMALA

EXPLORATION: Despite a number of dry holes, exploration continues in Guatemala. The recent discoveries in Mexico had some stimulating effect, since they are trending farther south and approaching the border of Guatemala in the Peten region.

Exploration work in a jungle area is often at a substantial disadvantage, since well locations are restricted by their accessibility, but the companies operating in the country evidently are not discouraged by their lack of success so far. Some have dropped out and surrendered their concessions but these areas were quickly taken up by companies remaining.

Principal wells drilled in 1960 were by Ohio Oil Co. of Guatemala, operator for a four-partner group which includes Amerada, Ohio, Continental and Union Oil of California. Two wells were drilled in 1960: Chinaja 1 was abandoned at 10,806 ft and San Roman was abandoned at 10,500 ft. Both had extreme mechanical difficulties and both had oil shows. Ohio is now looking for its third wildcat site.

Also drilling at the year's end was Atlantic Refining Co., operator for a group composed of Union Oil of California, California Standard, Standard of Ohio and Tidewater.

During 1959 Petroleum Investments Over-

seas, Ltd., (Shell), completed Laguna Blanca 1, between Fallabon and Flores in El Peten, as a dry hole at 3,971 feet in July. Compania Guatemala California de Petroleo (Standard Oil Co. of California), abandoned its test in the Livingston block in eastern Izabal at 8,300 feet.

Guatemala Atlantic Corp.'s cable tool rig drilled San Francisco 1A in Peten during 1959 where it was dry, at 6,000 ft and temporarily abandoned.

Signal Oil and Gas, which held a 20% interest in the Livingston test, completed its field work in Peten during 1960. Seismic activity has decreased, with only one crew operating in mid-1960. New concessions have been granted to Plymouth Oil Co. Puerto Barrios Petroleum Right 27 has been surrendered by Standard of California, Atlantic, Tidewater, Sohio, Signal and Bandini.

Delhi Guatemala Exploration Corp. (Delhi-Taylor subsidiary) was approved by the Guatemalan government as operator for the El Peten group which is exploring in northwestern Guatemala, in two areas comprising approximately 1,337,000 acres.

REFINING: A Guatemalan subsidiary of Canadian Shell resumed construction in 1960 of a refinery on Guatemala's Caribbean coast near Puerto Barrios. Construction work, which is being done by the Lummus Co., was held up briefly through an injunction against the Canadian Shell subsidiary obtained by a Guatemalan company. The refinery will represent an investment of about $5 million. Construction work will be completed and production started early in 1961. The relatively small capacity of 4,000 b/d will be distributed by Shell. Reconstituted crude from Venezuela or Curacao will be utilized.

A mixed group headed by Phillips Petroleum is to build a 12,000 b/d refinery to process Venezuelan crude in Guatemala. A license has been granted to Refineria Petrolcos de Guatemala, in which Phillips has a 38% interest. Stock is held by Oronzio Dinora, an Italian chemical manufacturer, and the rest by Guatemalans, according to Repegua president, Rudy Weissenberg.

OIL LAWS

No changes occurred in Guatemala's oil laws as outlined in WORLD PETROLEUM REPORT 1957, page 103, and (more briefly) in WORLD PETROLEUM REPORT 1958, page 77.

For a detailed and highly recommended study of petroleum industry legislation and regulation in Guatemala, the editor highly recommends *Petroleum Legislation*. This is a legislative reference service containing a summary and analysis of the oil laws and other industry regulation for every major country of the world. The national sections are prepared by legal counsel recommended by oil companies who have operated within the country concerned. In the case of Guatemala the review is prepared by the original author of the law, Mr. E. Batzell. The same oil law firm keeps its reviews up to date by loose-leaf revision service. For information on this excellent service, the publisher may be contacted directly at: *Petroleum Legislation Ltd., Post Office Box 1591, Grand Central Station, New York 17, New York.*

NATIONAL FACTORS

The political scene has remained fairly quiet and little change has occurred since the various factors affecting investment were outlined in WORLD PETROLEUM REPORT 1957—page 103.

A detailed study of taxation of petroleum in Guatemala has been prepared and will be available during early 1961 under the title of "*International Taxation Series.*" This series is devoted exclusively to petroleum taxation, covering every type of tax imposed on petroleum operations. Marketing, refining, transportation, exploration and production taxes are covered with a separate study of each. For an example of one of these national studies (all are prepared in exactly the same format) readers are referred to the Colombia section of this issue of WORLD PETROLEUM REPORT, that part entitled "Colombia—Petroleum Industry Taxation." Requests for information should be addressed to "*International Taxation Series,*" *Post Office Box 2744, Grand Central Station, New York 17, New York.* END

PANAMA

EXPLORATION: A number of concessions for oil exist (see World Petroleum Report 1960, page 36, for a concession map) but no drilling was reported for 1960. Champlin Oil & Refining Co. stated by letter that when another wildcat would be drilled had not yet been determined. Eastern States Petroleum Chemical Corp. was granted a large concession covering about 1,350,000 acres during the year. Delhi-Taylor Oil Corp.'s plans are reported "flexible" and no definite plans have been made for starting a well.

MARKETING: Use of petroleum within the country is quite high, about 22,700 b/d of crude equivalent. This includes bunkering in the Panama Canal, which is a very large user of oils.

REFINING: There are no refineries in Panama at present, but two are contemplated. A 30,000 b/d plant is under construction by Lummus Co. on Payardi Island, near the Caribbean entrance to the Panama Canal. It is owned by Continental Oil Co. and National Bulk Carriers, Inc., one of the Ludwig interests. Refineria Panama, S. A. is the name of the local company. Completion is scheduled by early 1962.

Another refinery is planned by Panama Refining and Petrochemical Co., formerly owned by Eugene Du Pont III, of Wilmington, Delaware, and John Shaheen, New York. Ultramar Co., London, purchased the company during 1960 for an exchange of shares. The company, which is known by its Spanish name of Refineria y Petroquimica de Panama, S. A., has been looking around for financing. It plans a 55,000 b/d refinery and has firm long-term contracts with several of the major companies calling for their compulsory purchase of certain amounts of products and the compulsory purchase by the refining company of their crude. These contracts are still in effect.

OIL LAWS

For a summary of the present oil law of Panama, Law 19 of 24 February 1953, see *World Peroleum Report—1957,* page 214. A revised draft of a petroleum code is presently before the Legislative Committee of the Panamanian legislature. The below summary has been supplied by Elmer Batzell, U. S. consultant who wrote the draft law. It is a Mineral Resources Code, applicable to all materials, including oil. It divides operations into two stages, exploration and extraction (the latter stage is designated "extraction" to accommodate its use for minerals other than oil). Provisions follow:

SUMMARY OF PANAMANIAN DRAFT OIL CODE[1]

Exploration: Duration: Exploratory rights have an initial seven-year duration. Two extensions are possible of two years each, if a discovery has been made, an intermediate period of four years is given to define the discovery.

Area: Maximum acreage for one concessionaire is 500,000 hectares (1,250,000 acres, approximately). There is no checkerboarding and no provision for reduction of this area during the exploration period. **Royalty:** 12½% during exploration period. **Company Ownership:** There is no requirement for government or private Panamanian participation in operating companies. **Taxation:** Surface rentals are on a rising scale (exact amounts of surface rentals has not been revealed). 75% of expenditures on exploration are creditable against surface rentals. **Income Tax:** Operators are subject to the Panamanian income tax, which is 41% effective rate on income of $1 million or over. Provision is contained in the law for expensing of intangibles. Geological prospecting may also be expensed (and unusual provision which is not contained in U. S. law). **Conversion:** Conversion of the exploration concession to extraction phase is guaranteed if a discovery has been made and if the concessionaire has fulfilled his obligations. Conversion is not guaranteed if no discovery has been made.

Extraction: This stage corresponds to the exploitation phase. **Duration:** 25 years initial term. Three extensions possible, the first for 10 years, the second and third for five years each. (Note: The governing Constitution of 1946 prohibits contractural rights of more than 20 years duration, but this difficulty evidently has been overcome.)

Area: Exploration acreage must be reduced by 50% on conversion to extraction phase. Maximum area during extraction phase per single concessionaire is 200,000 hectares (about 500,000 acres).

Depletion Allowance: A depletion allowance of 24% is granted on oil discoveries below 1,000 ft. until capital invested has been recovered. After that time the depletion is gradually reduced over a seven-year period to zero. Concessionaires are subject to the Panamanian income tax, which is a maximum of 34% on income of $1,000,000 or more, plus 20% surtax on the 34%, making a total effective tax rate of 41%. **50-50 Provision:** A clause is contained providing for 50-50 division of profits between concessionaire and government. (Note: government share would be less than 50% during the depletion allowance operation described above). **Royalty:** 14% on crude petroleum during the extraction phase. **Refining Obligation:** None. **Employment:** Foreigners may, in effect, be employed freely during exploration. After extraction begins, only 25% of personnel may be foreign.

[1] Summary from Petroleum Taxation Report, Post Office Box 1591, Grand Central Station, New York 17, New York, a world-wide review of oil law news, published monthly.

NATIONAL FACTORS

There is no change from the national factors listed in World Petroleum Report—1957, page 214. The factors favorably influencing investment climate include close connections with the

United States, currency stability, no discrimination against international companies, a low income tax rate, and no exchange control. Attractive inducements are given international investors in the form of tax remissions for 25 years.

Some anti-U.S. sentiment has grown up in the past few years, culminating in small scale riots in the Canal Zone during 1960. During 1960 Roberto Chiari was elected president, defeating the former president, Ricardo Arias. He is less moderate in his demands for concessions from the U.S. concerning the Panama Canal Zone, it is believed.

A detailed study of taxation of petroleum in Panama has been prepared and will be available during early 1961 under the title of *"International Taxation Series."* This series is devoted exclusively to petroleum taxation, covering every type of tax imposed on petroleum operations in all countries. Marketing, refining, transportation, exploration and production taxes are covered, with a separate study of each. For an example of one of these national studies (all are prepared in the same format) readers are referred to the Colombia section of this issue of World Petroleum Report, that section entitled "Colombia—Petroleum Industry Taxation." Requests for information on the entire series should be addressed to *"International Taxation Series," Post Office Box 2744, Grand Central Station, New York 17, New York.* END

PUERTO RICO

EXPLORATION: The country's first exploratory well, Commonwealth of Puerto Rico 1, was drilled on a 200,000-acre concession held by a Houston independent oil operator, David L. Gordon, and others. Kewanee Oil Co., Tulsa, Oklahoma, drilled the well at a location some 30 miles east of the City of Ponce. It was abandoned dry at about 7,000 ft with no shows during 1960. Kewanee followed with two more dry wells on the same side of the island, and then moved in late 1960 across to a location 50 miles west of San Juan for a fourth test, Kewanee Commonwealth of Puerto Rico 4. This test was also dry, according to unconfirmed reports.

No other companies are drilling, although Ponce Oil Co., Allastair Frazer, Catacact Mining Corp., R. L. Roger, and others hold concessions.

PRODUCTION, REFINING, MARKETING: There is no production of crude oil. Refining consists of two plants, one owned by Commonwealth Oil Refining Co. at Guayanilla Bay with 75,000 b/d capacity, and other operated by Caribbean Refining Co. with 13,500 b/d at San Juan. Both operate on Venezuelan crude.

There is a large petrochemical plant, built by Gongalez Chemical Industries, Inc., with 50% owned by Grace & Co.

Gulf Oil Corp. opened 10 new service stations about October 1 in the greater San Juan area as the first phase of its entry into marketing activities in the island commonwealth. The new units are operated by independent Puerto Rican businessmen. Gulf Oil is the fifth major to move into island-wide marketing.

OIL LAWS

Puerto Rico has enacted legislation to stimulate the search for oil. Activities are governed by the Regulations for Prospecting, Leasing, and Producing Oil and Gas in Puerto Rico, effective 6 June 1955, as amended 11 July 1956, and 14 November 1957.

For a detailed and highly recommended study of petroleum industry legislation and regulation within Puerto Rico, the editor highly recommends *Petroleum Legislation.* This is a legislative reference service containing a summary and analysis of the oil laws and other industry regulation for every major country of the world. The national sections are prepared by legal counsel recommended by oil companies who have actually operated within the country concerned. The same oil law firms keep their reviews up to date by loose-leaf revision service. For information on this excellent service, the publisher may be contacted directly at: *Petroleum Legislation Ltd., Post Office Box 1591, Grand Central Station, New York 17, New York.*

NATIONAL FACTORS

The principal factors influencing investment are the favorable oil and tax legislation, combined with a rising economy which has come up considerably in the past few years through "Operation Bootstrap." Muñoz Marin was re-elected as governor during 1960, and it was under his guidance that past progress has been made.

The U. S. Federal income tax does not apply to Puerto Rico, which has its own 20% tax. The U. S. restriction on imports of petroleum also does not apply to Puerto Rico, and any production found could be freely imported into the United States.

A detailed study of taxation of petroleum in Puerto Rico has been prepared and will be available during 1961 under the title of *"International Taxation Series."* This series is devoted exclusively to petroleum taxation, covering every type of tax imposed on petroleum operations in all countries. Marketing, refining, transportation, exploration and production taxes are covered, with a separate study of each. For an example of one of these national studies (all are prepared in exactly the same format) readers are referred to the Colombia section of this issue of *World Petroleum Report,* that part entitled "Colombia—Petroleum Industry Taxation." Requests for information on the entire series should be addressed to *"International Taxation Series," Post Office Box 2744, Grand Central Station, New York 17, New York.* END

TRINIDAD

EXPLORATION AND PRODUCTION: The upward trend in the production of crude oil which began in Trinidad some six years ago continued during 1960. It is estimated a total production of 42 million barrels was obtained at an average production of 115,000 b/d in 1960. Owing to the 18-day oil strike in July 1960, annual production is less than forecast at the beginning of the year. This is exemplified by average production which between January and June 1960 amounted to 118,000 b/d. A daily production of over 121,000 b/d was, however, established in August, and it appears that this level will continue to the end of the year.

Throughout the year development drilling was continued in the Gulf of Paria, where about 17,000 b/d is being obtained from the Soldado field.

During the first half of 1960, an average of 25 drilling rigs were in operation, and a similar average was maintained during the second half of the year.

Total footage drilled between January and June 1960 was 758,000 ft. Estimated total for the year is 1.4 million feet. A total of 153 wells was completed during the first half of 1960, and approximately 276 wells throughout the entire year, with a success ratio of about 85%.

Dominion Oil Ltd. (a Standard of California subsidiary) abandoned its marine appraisal work in August 1960, after completion of eight exploratory tests of which only one well was successful in establishing oil production. Of four additional development wells drilled by Dominion to determine the extent of the field, only two were productive, indicating only a small find.

Pan American et al Offshore: During late January 1961 it was announced that two million acres on the east and southeast area of Trinidad had been awarded to a group composed of Pan American International, Pure Oil and Sun Oil companies, each holding one-third interest. The contract under which they operate is a 50-50 profits split, anticipating the oil law which the government has under consideration and it, with the Dominion contract, will comprise the oil regulation of Trinidad, in effect (Dominion has an option on 100,000 acres within the concession areas, but is not expected to take it up). Terms of the group's contract are: *Minimum work obligation* in the first year is about $500,000. Thereafter, about $1 million. Reduced in case of early surrender of some of the acreage. *Bonus:* None. Exploration license 10 years, 5-year extension possible if commercial production found. 25% must be surrendered after 10 years, and another 25% after the 5-year extension. If a commercial discovery is made, the group may take out any number of exploitation blocks, 15,000-acre around the find, with a life of 30 years.

Sliding scale of rentals: Exploitation tracts will cost 10 cents (British West Indies currency) per acre the first year, to rise in steps to a maximum of $1.80 (BWI) per acre annually after 10 years. This is roughly a range from 6 cents to $1.08 per acre annually in U. S. currency. *Royalty:* 12%.

Dominion Oil began its exploration drilling program in the Gulf of Paria in September of 1957. A floating barge rig was used in the first stage of this program and drilled six wells, which culminated in the deep condensate discovery of the South Domoil field.

Following the discovery and successful testing of the South Domoil No. 1 well, plans were made to bring an offshore unit from the USA Gulf Coast. The mobile unit, Rig No. 55, owned by the Offshore Co., of Baton Rouge, La., arrived in Trinidad in July of 1959. This rig completed the discovery well by installing a well jacket and extending the surface and

TRINIDAD—Crude Oil Production by Areas during January-June, 1960

Field	Producing Formation Name and Age	Year of Discovery (Original Field)	Production—bbl Jan/June 1960	Character of Oil Gravity A.P.I.	Producing Formation Character	Producing Formation Structure	Deepest Formation Tested to end June '60	Depth of Deepest Hole Drilled
Brighton-Vessigny & Adjacent Marine Areas	Forest, Mio; Nariva, Mio.	1908	1,506,535	16—38	S	AF	Cretaceous	8,653
Forest Reserve-Apex San Francique-Pt. Fortin E.	Forest and Cruse, Mio.	1913	6,084,688	15—33	S	A	Miocene	16,115
Guayaguayare	Forest and Cruse, Mio.	1902	926,612	15—49	S	AF	Cretaceous	7,919
Kern-Parrylands-Cruse	Forest and Cruse, Mio. Nariva, Mio.	1913	931,289	13—30	S	MC	Eocene	10,626
Palo Seco - Los Bajos	Morne L'Enfer, Forest and Cruse, Mio.	1926	2,681,474	16—33	S	A	Miocene	12,718
Penal - Barrackpore	Forest, Mio; Wilson, Mio; Herrera, Mio.	1918	1,767,395	11—35	S	AM	Herrera, Mio.	11,067
Pt. Fortin - Pt. Ligoure	Morne L'Enfer, Mio; Cruse Mio.	1908	715,660	15—45	S	AF	Cretaceous	10,800
Soldado Marine	Cruse, Mio.	1955	2,870,923	17—35	S	A	Miocene	9,010
South Domoil	Manzanilla, Mio.	1959	123,927	47	S	AF	Miocene	11,387
Quarry-Corra-Quinam-Morne Diablo	Morne L'Enfer, Forest and Cruse, Mio; Herrera, Mio.	1936	1,451,375	16—30	S	AM	Cretaceous	14,018
Moruga East	Morne L'Enfer, Forest and Cruse, Mio; Cret.	1953	67,799	11—40	S	AF	Cretaceous	9,693
Moruga West	Karamat; Herrera, Mio.	1957	624,415	30	S	AF	Cretaceous	8,604
Balata - Bovallius	Karamat; Herrera, Mio.	1952	77,475	29—35	S	AF	Herrera, Mio.	9,426
Catshill	Forest and Cruse, Mio.	1953}	640,360	36—46	S	AF	Herrera, Mio.	9,095
	Karamat, Mio.	1953}		29	S	AF	Herrera, Mio.	9,095
Oropouche	Retrench, Mio.	1954	99,110	35	S	AF	Eocene	9,077
Inniss/Trinity-Moruga N.	Herrera Mio.	1956	922,653	33	S	AF	Herrera	5,127
TOTAL TRINIDAD PRODUCTION:								
		During Jan/June 1960	21,491,690					
		To end June 1960	699 million (estimated)					

S—Sandstone; A—Anticlinal; AF—Anticlinal with faulting as important factor; AM—Accumulation due to both Anticlinal and Monoclinal Structure; MC—Monocline with accumulation due to change in character of stratum.

TRINIDAD—Breakdown of Total Production—6 months, 1960

	— CROWN —			— PRIVATE —		
	b/d Per Well	No. of Wells	Total bbls	b/d Per Well	No. of Wells	Total bbls
Jan.	41.5	2,454	3,164,380	15.5	819	394,625
Feb.	42.3	2,453	3,010,583	16.7	822	398,021
March	43.2	2,443	3,275,331	17.2	797	424,790
April	43.4	2,426	3,159,065	17.1	803	413,161
May	44.1	2,423	3,309,176	16.4	808	411,861
June	43.4	2,411	3,141,273	16.2	803	389,424
			19,059,808			2,431,882

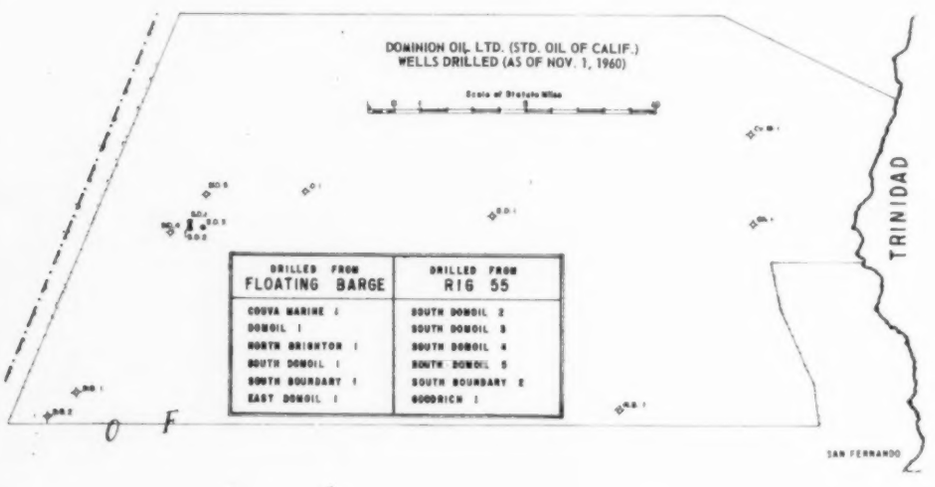
production casing to surface. During the succeeding 12 months, four development wells and two wildcats were drilled, completing the second stage of offshore exploration. Three wells are presently producing a total of 1000 b/d of 50-deg API condensate.

Stekoll Petroleum Corp. has taken a farmout on 20,000 acres in the Colenso area of Trinidad from Dominion Oil Co., a subsidiary of Standard Oil Co. of California. Four wells will be drilled to 5,000 ft or to production.

A new offshore drilling program is getting started on the Trinidad side of the Gulf of Paria, where Kern Trinidad Oilfields has engaged Zapata Offshore Co. to drill an indefinite number of wells from a mobile barge on a 5,700-acre marine license. Kern Trinidad already has completed two exploratory wells in the gulf, drilled from shore-based locations. Christiana Oil Corp. has a 15% net-profit interest in the operation. Kern is a subsidiary of Rio Tinto Co.

An onshore discovery in the East San Francique area on acreage held by Premier Consolidated Oilfields, of London, has spurred plans for further drilling in the area. Panoil Co., Dallas, which has a management contract with Premier, had planned to drill 12 wells in 1960 in the vincinity of a shallow discovery at East San Francique 4. The well has been completed from 800 ft to 830 ft, and flowed 250 bbl of 23-gravity crude in a 15-hour test through a ⅜-in. choke.

The sixth geophysical survey carried out by Shell in the Ortoire area was started in November 1960 in a further attempt to elucidate the difficult geology of the area. Three seismic and two gravimetric surveys, previously undertaken in this area, were followed by extensive drilling projects which resulted in the finding of small quantities of oil.



REFINING: During the first half of 1960, the Texaco refinery at Pointe-à-Pierre, and the Shell refinery at Point Fortin, together processed a total of 38.3 million barrels of crude oil, averaging 210,000 b/d.

The first stage of the refinery expansion program started by Texaco towards the end of 1959 was completed in April 1960, when the new 100,000 b/d distillation unit was brought into service, thereby increasing Texaco's refining capacity to 235,000 b/d. The additional units due to be completed during the year included a 15,000 b/d Platformer and a 20,000 b/d Hydrotreater.

Texaco Trinidad Inc. has wholly owned crude oil pipelines ranging in size from 6 in. to 10 in. and, the total length of these lines is about 100 miles. Their trunk gas lines range in size from 6 in. to 12 in., and their total length is about 30 miles. These pipelines connect various nearby producing fields with Texaco's refinery at Pointe-à-Pierre.

MARKETING: The 23-year marketing partnership between Shell and Texaco was terminated on January 1, 1960, by mutual agreement between the two companies, which have set up separate marketing organizations in Trinidad. The joint organization, formerly known as Shell & Regent Distributors Ltd., was registered in January 1936 by Shell & Trinidad Leaseholds Ltd.; the latter was acquired by Texaco in 1956. The third marketing company in Trinidad is owned and operated by Esso.

In September 1960 a takeover bid for Apex (Trinidad) Oilfields Ltd. was made by British Petroleum. Four years ago BP acquired a controlling interest in Trinidad Petroleum Development Co. Ltd.

An extensive refinery improvement program completed by Shell during 1960 increased its Trinidad refinery capacity to 70,000 b/d from 50,000 b/d. Despite its onshore drilling, Shell's production from land wells is declining; however, the company hopes to meet the increased needs of the refinery from its own and other company marine wells in Trinidad.

OIL LAWS

For a detailed and highly recommended study of petroleum-industry legislation and regulation within Trinidad, the editor highly recommends *Petroleum Legislation*. This is a legislative reference service containing a summary and analysis of the oil laws and other industry regulation for every major country of the world. The national sections are prepared by legal counsel recommended by oil companies who have actually operated within the country concerned. The same oil-law firms keep their reviews up-to-date by loose-leaf revision service. For information on this excellent service, the publisher may be contacted directly at: *Petroleum Legislation Ltd., P. O. Box 1591, Grand Central Station, New York 17, N. Y.*

The legal and fiscal requirements of the petroleum industry in Trinidad as published in *Petroleum Legislation*, Vol. 2, remain unchanged with the exception of the formula for the determination of the field storage value of crude oil for royalty purposes. The amended formula provides for the price of the "light fractions" content of the crude oil to be determined by subtracting from the low price at USA Gulf Coast for 87-octane regular the sum of 0.875¢ (U.S.) per U. S. gallon. This change was recently agreed upon following the discontinuation of quotations by *Platt's Oilgram* for 70-72 octane leaded gasoline.

Revision of Trinidad's petroleum legislation is planned, with the help of Canadian advisors who will undoubtedly produce some type of legislation similar to that in Canada at present.

NATIONAL FACTORS

The government attitude toward investment is favorable, as previous issues of *World Petroleum Report* have pointed out. Of particular interest is the taxation of petroleum activities, which is the subject of a study to be published during 1961, known as *International Taxation Series*. Information concerning it is available from the publisher, at *P. O. Box 2744, Grand Central Station, New York 17, N. Y.* This study covers all petroleum activities from exploration through development, refining, transportation, and marketing. A condensed excerpt from the Trinidad section of the series (which covers the entire world) follows directly.

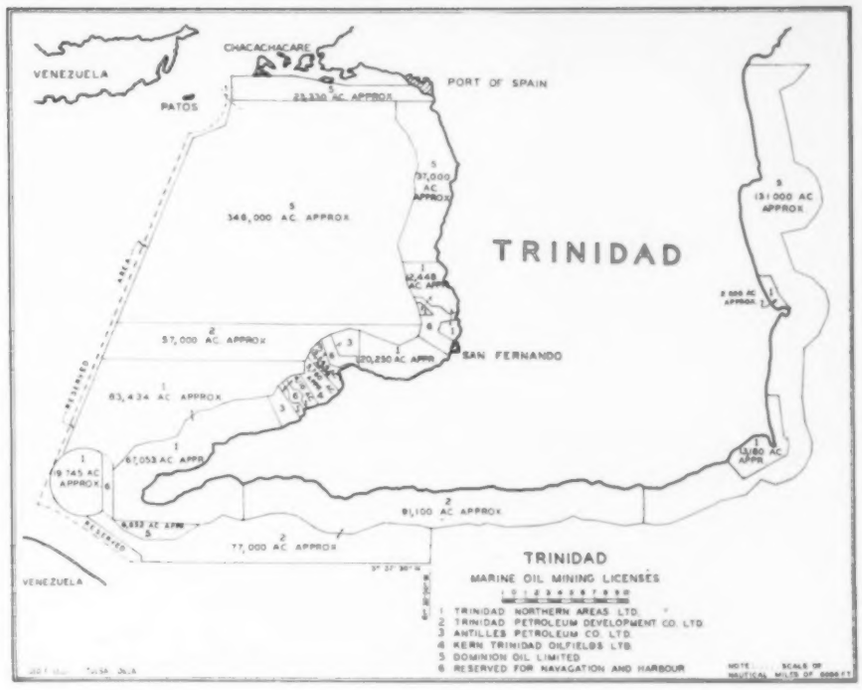
Petroleum-Industry Taxation: The oil industry pays income tax on the same basis as any other corporate organization in the territory, i.e., at the corporate rate of 40% of taxable income. Such items as royalties, customs duties on material chargeable to profit and loss account, and other contributions to government revenue are allowable deductions in arriving at taxable income.

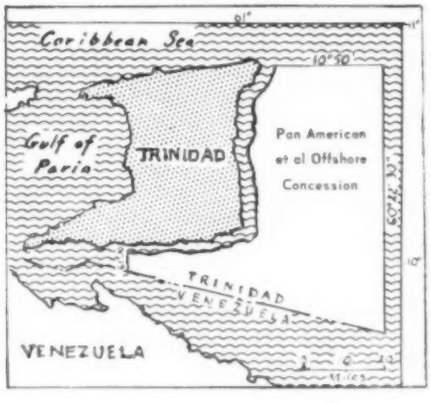
There is an excise tax on local sales of gasoline and kerosine which is payable by the consumer, whether such consumer is the public or industry. The excise tax on regular-grade motor gasoline is 9¢ (W.I.) per gallon; on premium grade 18¢ (W.I.) per gallon; and on kerosine 6¢ (W.I.) per gallon.

Way-leaves are payable on pipelines crossing government property under Government Notice No. 63 entitled "The Pipelines (Specification of Fees) Order, 1957."

In addition to the foregoing, there are the normal payments such as land and building rates; harbor and light dues, etc., which are statutory and applicable to all and sundry.

END





TRINIDAD—Production and Disposal of Natural Gas
(All figures in thousands of cub. ft)

	GAS PRODUCTION		GAS DISPOSAL				
1960	Gas Production	Inter-Company Sales and Transfers	Used as Fuel	Replaced in Formation	Losses and Unaccounted for	Not Collected	Flared as Surplus
JANUARY	8.411.713	2.500.607	2.292.551	1.036.639	288.345	1.454.881	3.339.297
FEBRUARY	8.153.636	2.335.456	2.086.784	984.321	246.614	1.421.146	3.414.771
MARCH	8.575.640	2.648.221	2.328.550	1.021.753	283.103	1.596.810	3.345.424
APRIL	8.421.739	2.579.980	2.316.610	964.466	257.786	1.478.697	3.404.180
MAY	8.810.974	2.682.008	2.414.001	1.045.283	265.792	1.693.866	3.392.032
JUNE	8.188.641	2.628.725	2.325.638	906.210	435.093	1.548.178	2.973.522
TOTALS	50.562.343	15.374.997	13.764.134	5.958.672	1.776.733	9.193.578	19.869.226

TRINIDAD—Monthly Analysis of Drilling Wells for Six Months, 1960

	DRILLING WELLS COMPLETED					MONTHLY FOOTAGE DRILLED			
	Completed as Oil Wells		Abandoned Dry Holes						
MONTH	No.	Aggregate depth in ft.	No.	Aggregate depth in ft.	Total Completions	Crown Oil Rights	Private Oil Rights	Total	Avg. Footage Drilled per rig per day
JANUARY	32	162.107	—	—	32	118.533	11.560	130.093	140
FEBRUARY	19	88.038	5	19.050	24	128.765	10.826	139.591	160
MARCH	29	134.186	2	15.835	31	120.326	16.578	136.904	147
APRIL	17	85.391	1	5.964	18	118.786	5.774	124.560	154
MAY	22	103.330	5	23.115	27	119.926	9.678	129.604	155
JUNE	19	86.206	2	14.339	21	94.577	2.773	97.350	130
TOTALS & AVERAGES	138	659.258	15	78.303	153	700.913	57.189	758.102	147

WORLD-WIDE
MANUFACTURING AND SERVICE

Leeds, England

Houston, Texas

Mexico City, D.F., Mexico

Edmonton, Alberta, Canada

Beziers, Herault, France

Five Plants now produce the Famous Cameron Pressure Controls

Cameron products are available and manufactured world-wide in five Cameron plants, France, England, Canada, Mexico and the United States. Processes in each plant follow the same specifications and rigid controls established by the home plant in Houston, Texas. All parts regardless of place of manufacture, are interchangeable for like parts on all Cameron equipment. Call, write or come by any one of the Cameron plants or offices located throughout the world.

Cameron

Cameron Iron Works, Inc., P. O. Box 1212, Houston, Texas

NORTH AMERICA

ALASKA

EXPLORATION AND PRODUCTION*: The discovery of extensive reserves of natural gas and the addition of more producers to Alaska's oil picture have stimulated the oil industry into something resembling a boom.

Gas holds the center of the stage, with the announcement by Alaska Oil & Mineral, Halbouty Alaska Oil Co. and King Oil, Inc., of a new gas discovery on the Kenai Peninsula. Estimated at an open flow rate of 80 mmcf/d, the well would appear to establish the presence of a new field, the West Fork Gas Field. Drilled to a total depth of 14,019 ft, the 1-B Alaska Oil & Mineral-King Oil, Inc. well was plugged back and completed through perforations at the interval of 4,992 to 5,020 ft. Two additional zones are considered capable of commercial production.

Alaska Oil & Mineral has been active in Alaska since 1953 and has acquired considerable lease holdings throughout the state. Halbouty, with the King Oil Co., had previously drilled two dry holes.

The recent gas discovery, coupled with a Standard-Richfield gas well, and the extensive gas reserves of the Union of California and Ohio Oil Co.'s Kenai Unit, pose the problem of how to utilize the unlimited gas reserves at hand. It is anticipated that the three wells on the Kenai Unit, committed to the Alaska Pipe Line Co., can supply the needs of the Anchorage market area during the next twenty years.

Studies are now underway to determine the feasibility of extending the gas line north from Anchorage along the railbelt area towards Fairbanks. Also of interest are studies now being made by Union and Ohio, relative to the liquification of methane gas for shipment to Japan. The drilling of three additional development wells on the Kenai Unit will further determine the size of the gas reserves which could be committed to such a project, should it prove feasible.

Field Developments: In addition to the Halbouty West Fork Gas Field discovery, the year 1960 saw the new pool discovery, the Soldotna Creek Unit 41-4. This very significant discovery was hailed as demonstrating that the Swanson field would prove commercial. The discovery well, spudded December 31, 1959 and drilled to a total depth of 11,315 ft, was completed March 15, 1960. On a three-hour test, ½-in. choke, the well produced at a daily rate of 1,870 bbls. Production was from the Hemlock zone in the interval 10,230 to 10,250 ft and flowed 39 degree gravity oil with a gas-oil ratio of 260:1.

Almost simultaneously with the announcement of the new pool discovery was the news of Swanson River Unit 23-22; flowing 550 b/d. Subsequent to this discovery additional completions with the Swanson River and Soldotna Creek pools have been announced. A total of ten wells have been completed with eight completions occurring during 1960. Production is from the Swanson River Unit Hemlock Pool and the Soldotna Creek Unit Hemlock Pool.

In November, 1960, Union Oil of California and the Ohio Oil Co. commenced the first of three development wells on the Kenai Unit, the site of the Union-Ohio gas discovery. The three tests are expected to aid considerably in evaluating the gas reserves of the field.

An important test of the Koyukuk Cretaceous basin, authored by Paul G. Benedum and some seventeen other independents, was drilled to a depth of 12,015 ft and abandoned. While no information has been released by the operator to date, leases are being dropped in the area and it is believed that nothing of geologic significance was encountered in the section tests. Participants with Benedum included Ambassador Oil Co., BP Exploration Co. (Alaska), Inc., El Paso Natural Gas Co., Michel T. Halbouty, Claud B. Hamill, Kenwood Oil Co., Northern Natural Gas Producing Co., Pan-Alaska Co., Peake Petroleum Co., Peerless Oil & Gas Co., Texas Gas Exploration Corp., Texas National Petroleum Co., Tex-Star Petroleum, Robert Uihlein, Woodley Petroleum Corp. and Union Carbide Corp.

TRANSPORTATION: October 10 marks the date when the vales were opened on the Kenai Pipe Line's 8-in. transmission line, permitting 5,500 b/d to flow to the marine terminal at Nikiski. The subsequent announcement that Swanson River Unit 12-15 and Soldotna Creek Unit 12-9 were completed as producers is indicative that the line's throughput will continue to increase substantially in the months ahead. The 22-mile line, with gathering facilities connecting the Swanson River and Soldotna Creek pools with the tidewater terminal at Nikiski, represents a $5 million investment on the part of Standard Oil Co. of California, Western Operations, Inc., and the Richfield Oil Corp. The Kenai line has an immediate potential of 10,000 b/d, expandable to 35,000 b/d with additional pumping and storage facilities. The one pumping station now going into use is located near the Soldotna feeder point and is remotely controlled from the tanker terminal. This terminal is constructed to handle tankers of up to 28,000 deadweight tons and will have an hourly discharge capacity of 15,000 bbl.

OIL LAWS

1960 was a highly significant year in the field of legislation, affecting Alaska as well as all the public land states. The Mineral Leasing Act of 1920, as amended, was severely overhauled. The change of greatest importance to Alaska was the proviso dividing the state into two leasing districts and allowing an individual or corporation to hold upwards of 300,000 acres of leases in each of the districts. Heretofore, Alaska had suffered from the acreage limitation permitting a maximum holding of 100,000 acres under lease and 200,000 under option.

For an accurate and concise review of Alaska's oil regulation recommendation is made of *Petroleum Legislation*, a legislative reference work for oil that is contained in several volumes and covers the world. Its oil legal reviews are compiled by law firms within the country that have been recommended by oil companies operating there. The same firms keep their reviews up to date by loose-leaf revision service. Inquiries should be addressed to the publisher directly as follows: *Petroleum Legislation Ltd., Post Office Box 1591, Grand Central Station, New York 17, New York.* END

*Review by Charles W. Barnes, The Alaska Scouting Service, Anchorage, Alaska.

OIL AND GAS WELL ACTIVITY, ALASKA—1960

Company Name	Well Name	Sec.	Twp	Range	B&M	Spud Date	Completion Date	Total Depth	Footage[1]	Status
Benedum & Associates	Nulato Unit No. 1	7	10S	2E	KR	11/29/59	5/25/60	12,025	±11,400	P&A
Richfield Oil Corp.	Kaliakh No. 1	34	20S	14E	CR	12/3/59	6/6/60	13,421	± 7,643	P&A
Standard-Richfield	Swanson River Unit 14-27	27	8N	9W	S	12/26/59	6/14/60	11,436	± 8,400	Oil
Standard-Richfield	Soldotna Creek 41-4	4	7N	9W	S	12/31/59	3/21/60	11,315	± 8,300	Oil
Standard-Richfield	Swanson River Unit 23-22	22	8N	9W	S	1/5/60	3/9/60	11,614	11,614	Oil
Pan American Pet. Corp.	Napatuk Creek Core #2	27	8N	7W	S	3/8/60	4/7/60	1,423	1,423	P&A
Standard-Richfield	Swanson River Unit 32-10	10	8N	9W	S	3/17/60	5/28/60	12,029	12,029	Gas
Standard-Richfield	Soldotna Creek Unit 32-4	4	7N	9W	S	3/31/60	6/3/60	11,119	11,119	Oil
Pan American Pet. Corp.	Napatuk Creek Core #2A	27	8N	7W	S	5/14/60	5/26/60	2,140	2,140	P&A
Standard-Richfield	Soldotna Creek Unit 14-4	4	7N	9W	S	6/5/60	8/13/60	11,520	11,520	Oil
Richfield Oil Corp.	Kaliakh No. 2	28	20S	14E	CR	6/14/60			9,575[2]	
Halbouty Alaska Oil	1-B Alaska Oil & Mineral-King Oil Inc.	21	6N	9W	S	6/15/60		14,019	14,019	
Standard-Richfield	Swanson River Unit 32-33	33	8N	9W	S	6/21/60	8/25/60	11,385	11,385	Oil
Colorado Oil & Gas Corp.	Dangerous River Unit #1	17	29S	37E	CR	6/25/60			6,033[2]	
Standard-Richfield	Swanson River Unit 12-15	15	9N	9W	S	7/23/60	10/5/60	11,383	11,383	Oil
Standard-Richfield	Swanson River Unit 41-33	33	8N	9W	S	8/8/60	7/17/60	3,000	3,000	WSI
Standard-Richfield	Soldotna Creek Unit 12-9	9	7N	9W	S	8/16/60	10/9/60	10,785	9,936	Oil
Halbouty Alaska Oil	Bishop Creek Unit 11-11	11	7N	11W	S	8/20/60	9/10/60	9,034	9,034	P&A
Standard-Richfield	Swanson River Unit 12-34	34	8N	9W	S	9/4/60		11,032	7,343[2]	

[1]Total in 1960 as of Sept. 20, except as otherwise noted.
[2]Drilling well-depth given is Sept. 19 and 20 depths, with exception of the Dangerous River Unit #1, which is on 9/15/60.

UNITED STATES

EXPLORATION: Despite intensive exploration, totaling about 9,625 exploratory wells, no major oil field discoveries were made during 1960, based on preliminary data. Of the total wells, 875 discovered oil, 450 found gas and condensate, and 8,300 were dry.

The ratio of wells discovered deteriorated slightly compared with 1959 and 1958 (see table headed Well Completions in United States).

PRODUCTION: Domestic crude oil production for 1960 is estimated at about 2 billion 568 million barrels (7,016,393 b/d) or some 6 million barrels less than in 1959. Production of natural gas liquids, however, increased by about 23 million barrels to approximately 344 million barrels, bringing total domestic production of liquid hydrocarbons to slightly more than 2.9 billion barrels, an increase of 17 million barrels over the previous year. Total imports of crude and refined products are estimated at approximately 669 barrels or about 20 million barrels more than in 1959.

Drilling operations were less active during 1960 than in recent years, with well completions totaling about 46,500, as compared with almost 51,000 in 1959. The Chase Manhattan Bank preliminary reports also indicate that capital expenditures by the oil industry declined moderately during 1960 to approximately $5.2 billion, from over $5.4 billion in 1959 and a 5-year average expenditure level of almost $6 billion.

REFINING: Refineries in the United States totaled 293 at the year's end, with total crude processing capacity of 9,986,350 b/d, and 3,639,000 b/d catalytic capacity. For a discussion of new processes developed during 1960, both in the United States and other countries, see Refining section in the World review, at the front of this issue.

The number of refineries in the United States has continued to decline steadily as plants are enlarged to take advantage of more efficient operating costs on a large scale.

Investment in refineries during 1961 is estimated to increase about 27%, compared with 1959 investment. Both 1959 and 1958 were extremely quiet years for refinery construction, and the industry still has excess refining capacity on hand. The expenditures during 1960 totaled about $367 million, and during 1961 are estimated to total about $468 million, both very low figures compared with the rapid expansion experienced during the mid-1950's.

Petrochemicals are rising very fast indeed. The increase in 1961 budgeted expenditures over 1960 is a surprising 77.2%, which includes scores of new projects in benzene, polyolefins, napthalene, styrene and olefins. The petrochemical industry is expanding its share of the market for films, detergents, fibers and a number of other products.

MARKETING: Although demand for petroleum products showed a further increase during 1960, the rate of gain was considerably less than the year before and substantially smaller than had been anticipated generally at the start of 1960. Domestic demand for petroleum products as a whole approximated 3 billion 532 million barrels, compared with 3 billion 450 million barrels in 1959. On a daily average basis, this works out to 9 million 651 thousand barrels and represents a year to year gain of only 2.1%, as contrasted with an increase of more than 4% experienced in 1959.

With exports showing a further slight drop to less than 75 million barrels, total demand (domestic and exports) for the year is placed at 3 billion 607 million barrels, or just 2% above the 1959 figure.

Demand for gasoline was especially disappointing, with indicated consumption for the year running only 2% higher than in 1959.

Consumption of distillate fuel for home and industrial use for 1960 showed an estimated increase of about 2.8% over 1959, but residual fuel oil demand was about 1.6% below 1959. On the other hand, sales of natural gas continued to expand sharply in 1960 and are estimated 8% over 1959.

OIL LAWS

A significant revision of United States Federal regulation of oil activities occurred during 1960. A review of this regulation has been published in a recognized legislative reference service, Petroleum Legislation. Prepared by the law firm of Ely, Duncan and Bennett, Washington, D.C., this review has been reproduced here through courtesy of Petroleum Legislation.

U. S. OPERABLE REFINERY CAPACITY AND RUNS TO STILLS

	1960	1959
Crude Oil Run to Stills	1,123,123[1]	8,123,123
Refinery Capacity[2] (barrels per day)	9,986,350[2]	9,901,424
Crude Oil Run to Stills (thousands of barrels)	2,954,900[3]	2,917,661
(barrels per day)	8,073,000[3]	7,993,600

[1] Operating and shutdown as of December 31.
[2] Based on American Petroleum Institute Refining Capacity Survey. Includes 64,000 barrels daily shutdown in need of major repairs as of September 30, 1960.
[3] Estimated.

U. S. PROVED RESERVES (December 31)

Petroleum (barrels of 42 U. S. gallons)	1959[1]	1958
Crude Oil	31,719,347,000	30,535,917,000
Natural Gas Liquids	6,522,308,000	6,204,018,000
Total Liquid Hydrocarbons	38,241,655,000	36,739,935,000
Natural Gas (millions of cubic feet)	262,596,593,000	254,142,037,000

[1] Latest available.
Source: American Petroleum Institute, American Gas Association.

IMPORTS OF CRUDE OIL AND PETROLEUM PRODUCTS (In Barrels Per Day)

	1960	1959[1]	1958
U. S. Excluding West Coast			
Crude Oil	747,000	731,200	768,100
Residual Fuel Oil	611,000	611,600	498,700
Distillate Fuel Oil	39,000	47,900	40,500
Others	118,000	133,000	185,800
Total	1,515,000	1,523,700	1,493,100
West Coast			
Crude Oil	273,000	234,100	185,400
Products	40,000	22,100	21,800
Total	313,000	256,200	207,200
Total U. S.			
Crude Oil	1,020,000	965,300	953,500
Products	808,000	814,600	746,800
Total	1,828,000	1,779,990	1,700,300

[1] Preliminary.
Source—Bureau of Mines, 1958-59; figures for 1960 are estimated on basis of first nine months Bureau of Mines data and subsequent weekly reports of the API.

CAPITAL EXPENDITURES IN THE PETROLEUM INDUSTRY

	1960[1]	1959
Production	$3,900,000,000	$4,000,000,000
Manufacturing	500,000,000	525,000,000
Marketing	400,000,000	450,000,000
Transportation	250,000,000	275,000,000
Other	150,000,000	175,000,000
Total	$5,200,000,000	$5,425,000,000

[1] Preliminary.
Source: The Chase Manhattan Bank.

WELL COMPLETIONS IN UNITED STATES

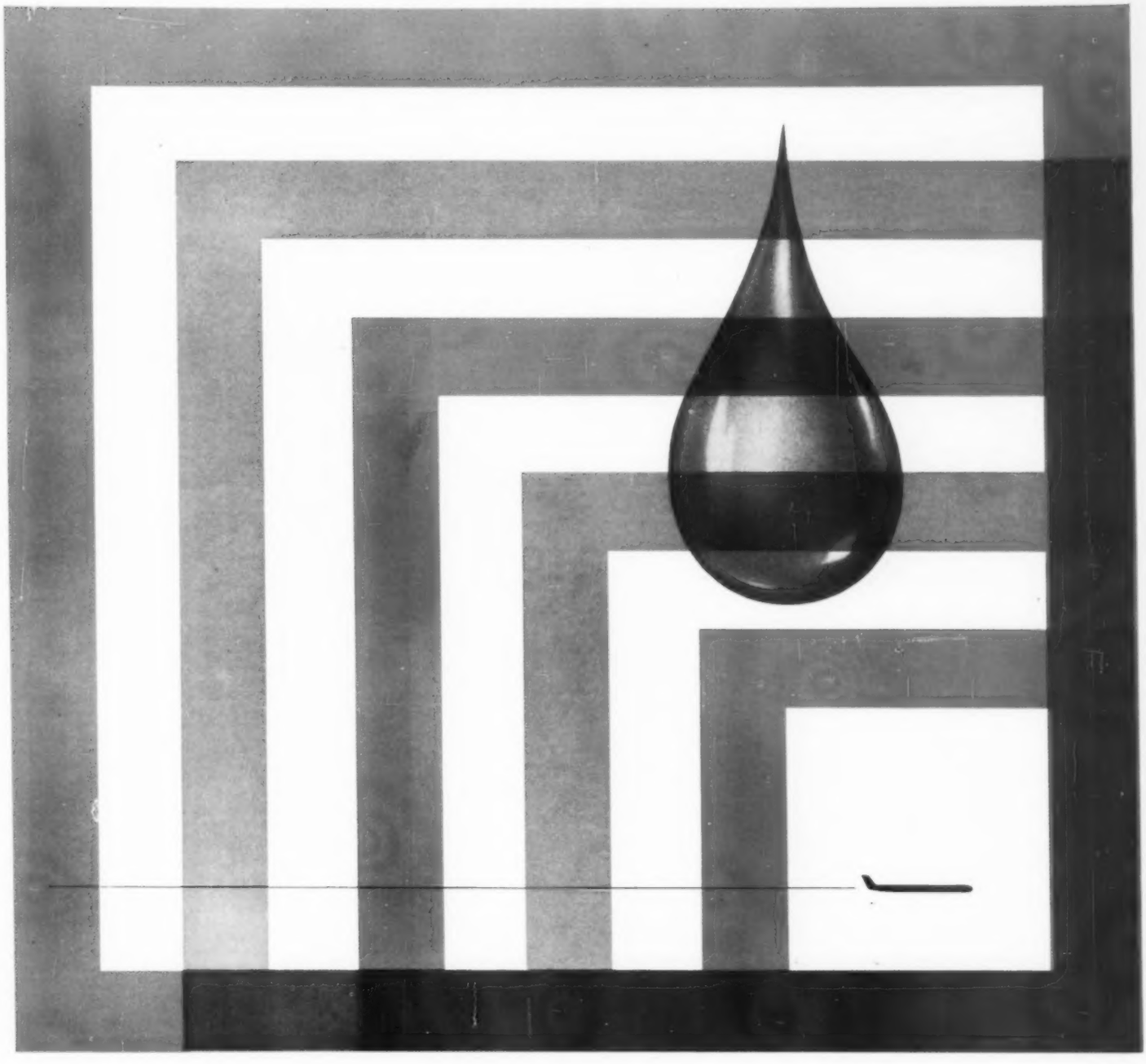
	1960[1]	1959
Oil	21,100	25,381
Gas and Condensate	5,300	5,026
Dry	17,400	19,113
Service	2,700	1,421
Total	46,500	50,941
Footage Drilled	191,200,000	208,250,000
Exploratory Wells (Included above)		
Oil	875	873
Gas and Condensate	450	453
Dry	8,300	8,747
Total	9,625	10,073

[1] Estimated.

SUPPLY AND DEMAND OF ALL OILS (THOUSANDS OF BARRELS) AND NATURAL GAS PRODUCTION (MILLIONS OF CUBIC FEET)

	1960		1959[1]		1958	
	Total	Daily Average	Total	Daily Average	Total	Daily Average
Crude Oil Production	2,568,250	7,017	2,574,590	7,054	2,448,987	6,709
Nat. Gas Liquids Prod.	343,950	940	320,858	879	295,165	809
U. S. Domestic Supply	2,912,200	7,957	2,895,448	7,933	2,744,152	7,518
Imports	669,000	1,828	649,670	1,780	620,589	1,700
Exports	74,700	204	76,975	211	100,638	276
Year End Stocks	783,170		808,970		788,796[2]	
Domestic Demand	3,532,300	9,651	3,449,612	9,451	3,315,213	9,083
Percentage Change		+2.12		+4.05		
Total Demand	3,607,000	9,855	3,526,587	9,662	3,415,851	9,359
Percentage Change		+2.00		+3.24		
Natural Gas (gross prod.)	15,350,000	41,940	14,229,272	38,984	13,146,635	36,018
Percentage Change		+7.58		+8.23		

[1] Preliminary.
[2] On new basis Jan. 1, 1959 stocks were 790,439; on Jan. 1, 1958, 839,906 barrels.
Source—Bureau of Mines, 1958-59; figures for 1960 are estimated on basis of first nine months Bureau of Mines data and subsequent weekly reports of the API.



fast, frequent cargo service to world oil centers

More frequent flights. More loading capacity. Faster connections between North America, Europe, Near, Middle and Far East. Unexcelled Supercargo Service. Expert handling, lowest possible rates. For complete information and space reservations, consult your Cargo Agent or Lufthansa offices in principal cities of the world.

LUFTHANSA
GERMAN AIRLINES

UNITED STATES LEGAL REGULATION OF THE PETROLEUM INDUSTRY*

Ownership and Control—In the United States, title to the hydrocarbons underlying a specific tract of land may be in the Federal Government, a state, or an individual. In general (and in contrast with the systems prevailing in most parts of the world) the mineral estate is part of the surface estate, and passes with it, unless and until severed. As of 1960, approximately one-fourth of the total land area of the continental United States, most of Alaska, and all of the outer continental shelf were held in federal ownership or subject to federal control. Many states own extensive lands and subsoil rights which comprize oil-producing properties. The remaining ownership rights to hydrocarbon deposits are held by private persons.

Rights to oil and gas deposits on federally owned lands may be acquired only pursuant to legislation enacted by Congress. Laws by which each of the states governs its oil lands are similar in their provisions to those of the Federal Government. Transfer of mineral rights and titles among private owners is accomplished within the legal framework of each state relating to property titles, sales and conveyances, leases, licenses, and contracts. In addition, the states, in the exercise of their reserved police powers, and the Federal Government, acting pursuant to its constitutional power over interstate commerce, taxation, or national defense, have enacted laws placing certain important restrictions upon the private use and enjoyment of mineral rights. This review is confined to the federal laws which govern the development of federal lands and which regulate oil and gas rights in general.

FEDERAL LANDS

Three general statutes, each pertaining to a different category of lands, authorize oil and gas development of federal lands: the Mineral Leasing Act of 1920 as amended, applicable to the public domain (lands originally owned by the United States pursuant to treaty or cession); the Acquired Lands Leasing Act of 1947, authorizing development of lands acquired by the United States from individuals or states; and the Outer Continental Shelf Act of 1953, which applies to lands of the outer continental shelf beyond the limit of those ceeded to the states. Other laws govern leasing of Indian lands and Naval Petroleum Reserves.

The Public Domain—Prior to 1920 a person could acquire fee simple title to public lands from the Federal Government which may have been valuable for oil. By virtue of the Mineral Leasing Act of 1920 (41 Stat. 437, 30 U.S.C. 181 et seq.) as amended, however public lands of the United States may now be explored and exploited for oil and gas only through lease. This applies as well to lands the surface estate of which may have been conveyed in the past, with a reservation of mineral rights in the United States. The lessee, however, acquires ownership of the oil and gas produced.

Oil and gas leases are issued by the Department of the Interior through its Bureau of Land Management and supervision of the leases is handled by the Geological Survey of the Interior Department.

Among the important amendments to the 1920 act is the act of August 21, 1935, granting the right to prospect for oil and gas under a lease rather than a prospecting permit, which act was liberalized by the acts of August 8, 1946, and August 2, 1954, to encourage prospecting on the public domain and the discovery of new sources of these minerals. Another important amending measure is the Mineral Leasing Act Revision of 1960 (Act of Sept. 2, 1960, 74 Stat. 781), which restates sections 17 and 27 in their entirety, and includes the so-called tar sands among the minerals subject only to development through lease. The Senate report submitted in connection with the 1960 revision anticipates that the tar sands leasing provision will "open the way to the recovery of many billions of barrels of oil from such sands and thus give the United States a vast new reserve of petroleum . . ."

Because of the changes effected by the Revision of 1960 the Interior Department suspended the issuance of all leases on September 2, 1960, the day the revisions were signed into law by the President. Issuance was resumed under an order of December 9, 1960 (published December 15, 1960, 25 F. R. 12903). The order notes that applicants must agree to any revisions in leases which might be required by the new law. The Department issued proposed regulations covering the new law on October 7, 1960 (25 F. R. 9647). Numerous comments were received which are presently under consideration. The new regulations in final form will probably not be issued until the Kennedy Administration has taken office and has had an opportunity to study them. This summary incorporates the changes made by the 1960 revision of the law but is necessarily subject to whatever regulatory interpretations may be made by the regulations yet to be issued.

Leases may be issued only to citizens of the United States, associations of such citizens, or corporations organized under the laws of the United States, or a state or territory thereof. Although aliens may not acquire any direct or indirect interest in such leases, they may own stock in corporations holding leases if the laws of their country do not deny similar privileges to citizens of the United States. A corporate applicant, however, must make full disclosure of its stock ownership so as to show whether stock is owned by aliens and if so the percentage of it so owned.

If it is desired to contest in court a final decision of the Secretary of the Interior in connection with an application or a lease, under the Administrative Procedure Act or otherwise, such action must be commenced within 90 days of the decision or it will be barred.

Acreage Limitations: Leaseholdings in any one state (except Alaska) by any individual or group may not exceed 245,080 acres. Alaska has been divided into two leasing districts, northern and southern, separated generally on a line made by the Tanana and Yukon rivers. Leases aggregating not more than 300,000 acres may be held in each district for a total of 600,000 acres. In computing holdings under these limitation figures federal acreage covered under options is included as a charge against both optionee and optionor, as their interests may appear. In addition, holders of more than a 10 per cent interest in any organization having leases will be charged their pro rata share of the organization's acreage under lease. Proportionate interests are also charged in connection with joint holdings.

Options: Acreage may be held under option but such options may be taken only on lands embraced in leases and applications for leases. The act provides for strict reporting controls on options and as above noted, requires that acreage held under option be charged against both the optionee and the optionor, the extent of the charge depending upon the nature of the interest the optionor seeks to acquire. Failure to comply with the reporting requirements on options renders them unenforceable by the optionor. An option may not be taken for more than three years (measured, in a case of an option on an application for lease, from the date of issuance of the lease and three years thereafter) although application may be made to the Bureau of Land Management for a period greater than three years to be accompanied by a complete showing as to the special or unusual circumstances believed to justify a longer period.

Exploration: A lease must be issued before exploratory work of any kind is permitted. In addition, an acceptable general lease or drilling bond must be filed prior to any drilling operations under a lease.

Exploitation: There are two kinds of leases: (1) noncompetitive, and (2) competitive. The type of lease depends upon the lands involved. Lands lying within any known geologic structure of a producing oil or gas field are subject to lease only by competitive bidding, whereas all other lands may be prospected by noncompetitive "wildcat" leases in which the lease goes to the first applicant.

Noncompetitive leases: The total area under a single lease may not exceed 2,560 acres or be less than 640 acres except under special circumstances. All such leases are now issued for a ten year primary term (formerly five years with a right to one extension) and so long thereafter as oil and gas is produced in paying quantities. Such leases may be extended for an additional two years if actual drilling operations are commenced prior to the end of the primary term or if the lands are embraced in a cooperative unit on which drilling is in progress prior to the expiration of the primary term.

Competitive leases: Lands within the known geologic structure of a producing oil or gas field are divided into leasing blocks or tracts in units not exceeding 640 acres each and offered for lease at a royalty and rental specified in the notice of sale to the qualified offerer stipulating the highest bonus, either by competitive bidding at public auction or by sealed bids. Notice of offer of lands for lease by the government is generally made by publication once a week for five consecutive weeks in a newspaper of general circulation in the county in which the lands are situated. The minimum royalty on competitive leases is 12½%.

Annual rentals: The act provides for the payment on all leases of a rental of not less than 50 cents per acre per annum. This rental must be tendered at the time of application for a noncompetitive lease, together with the $10 filing fee. The act also provides for a minimum royalty of $1 per acre in lieu of rental after a discovery of oil and gas in paying quantities. In its order of December 9, 1960, the Interior Department set 50 cents as the rental rate on noncompetitive leases. The order also notes: "If it is determined that the lands are wholly or partly within the known structure of a producing oil or gas field the annual rental shall be $2 per acre or fraction of an acre beginning with the first lease year after 30 days notice."

On competitive leases the annual rental of $1 per acre remains unchanged although the proposed regulations issued in October, which have not been adopted, set a $2 annual rental.

Unitization: Section 17(j) of the act authorizes lessees to agree with others or with private owners collectively to develop and operate a common pool or field under a cooperative or unit plan of development for the purpose of conserving the resource. Before any such unit or cooperative plan may be put into operation it must be approved by the Secretary. The Secretary may, in his discretion, with the consent of the leaseholders involved, change the minimum rental and royalty requirements and other terms of the leases. Acreage within such plans is not included in determining acreage limitations provided for by the act. The Secretary may provide that leases issued after the enactment of the revision of 1960 (i.e., after September 2, 1960) contain a provision requiring operation under a reasonable unit plan, and he may prescribe such a plan under which the lessee shall operate which shall adequately protect the rights of all parties in interest, including the United States.

Royalties: The minimum royalty is $1 per acre, in lieu of rental, payable at the expiration of each lease year after a discovery has been made, except that on unitized leases the minimum royalty is payable only on the participating acreage. Royalties on production are at the minimum rate of 12½%. On competitive leases, of course, the royalty may vary upward depending upon the rate stipulated by the successful bidder. On lands within exchange and renewal leases the royalties on oil production may vary from 12½% to 25% depending on the rate of production, and on gas from 12½% to 16 2/3%. Overriding royalties or payments out of production, which, when added to the royalty payable to the United States, aggregate in excess of 17½% are not authorized except in particular circumstances (see 43 CFR Section 192.83).

Bonds: A $5,000 general lease bond must be furnished prior to the beginning of drilling operations. Until such a bond is filed all lessees must furnish and maintain a bond in the amount of $1,000 with the exception of those noncompetitive lessees holding lands on which a bond is not required by law for the protection of owners of surface rights.

Assignment or Transfer: All or any part of a lease may be assigned or subleased, subject, however, to the approval of the Bureau of Land Management. Assignments of royalty interests must likewise be filed for the record. Assignments of 1% or less will be approved only upon specific request and then only after a discovery has been made. Such assignments will be deemed to be valid whether formally approved or not.

Termination: Leases may be surrendered by filing a written relinquishment in the proper land office. Such will be effective as of the date filed, subject to payment of any accrued rentals and royalties. A statement must accompany the relinquishment, advising that all monies due and payable to workmen have been paid. Nonproducing leases shall automatically terminate by operation of law if the lessee fails to pay the rental on or before the anniversary date of the lease. If the lessee fails otherwise to comply with any of the provisions of the act any lease figuring in a violation may be cancelled, forfeited or ordered divested in an appropriate proceeding to be brought by the Attorney General. Bona fide purchases from lessees who may have been in violation, however, are specifically protected under the act.

Acquired Lands—Acquired lands were opened to lease for oil and gas deposits under the Acquired Lands Leasing Act of August 7, 1947 (61 Stat.

*Prepared by Northcutt Ely of the law firm of Ely, Duncan and Bennett, Tower Building, Washington 5, D. C.

J. STONE & CO. (PROPELLERS) LTD.

82 PALL MALL, LONDON, S.W.1.

lease for oil and gas deposits under the Acquired Lands Leasing Act of August 7, 1947 (61 Stat. 913, 30 U.S.C. §351 (1952)). Amended regulations were issued in 1954. In general the act and regulations refer to the requirements of the Mineral Leasing Act of 1920, as amended, for oil and gas leases on acquired lands, provided the consent of any other government agency having jurisdiction over the lands is obtained. However, although many of the requirements are similar for public domain and acquired lands, the processing procedures are different and an applicant must be careful to apply under the correct statute in order to qualify for a lease.

Submerged Lands—Ownership of natural resources in lands beneath navigable waters was the subject of a long and bitterly contested struggle between the Federal Government and various coastal states until the passage of the Submerged Lands (67 Stat. 29, 43 U.S.C. §1301) and the Outer Continental Shelf Acts (67 Stat. 462, 43 U.S.C. §1331) in 1953.

The acts deeded to the states, or the persons who on June 5, 1950, were entitled thereto under state law, title and ownership of the lands and the natural resources of all lands beneath tidal navigable waters seaward to the states' historical boundaries on entering the Union, for a distance of not more than three geographical miles from the coast line in the Atlantic or Pacific Oceans, or more than three marine leagues (about ten and a half miles) in the Gulf of Mexico.

Lands beyond those deeded to the states were described as the "outer continental shelf" over which the Federal Government gained jurisdiction and control under the Outer Continental Shelf Lands Act.

The Secretary of the Interior is authorized under the act to administer the leasing of the outer continental shelf. Regulations governing the issuance of leases were promulgated by the Department on December 23, 1954. Outer continental shelf lands may be leased only pursuant to these regulations; the provisions of the Mineral Leasing Act of 1920 and its regulations are not applicable.

Oil and gas leases issued by the Secretary are required to cover a compact area not exceeding 5,760 acres, and extend for a period of five years and as long thereafter as oil and gas may be produced in paying quantities, or drilling operations are conducted thereon to the satisfaction of the Secretary.

Leases are granted by competitive bidding on the basis of a cash bonus with a royalty fixed by the Secretary at not less than 12½ per cent in amount or value of the mineral production. The Secretary, in his discretion, may fix a cash bonus and allow competitive bidding on the amount of the royalty, but thus far only competitive bidding on the cash bonus with a fixed royalty has been employed.

By 1959, the Secretary had under supervision 381 active leases aggregating 1,473,542 acres. Petroleum production from the outer continental shelf in 1959 was about 64 per cent greater than during 1958, and the production of gas was approximately 95 per cent greater. The total product value exceeded $126 million. Royalties and rental revenues totaled nearly $25 million.

In May 1960 the Supreme Court, in its decisions in the cases of *United States* v. *Louisiana* and *United States* v. *Florida*, fixed the offshore boundaries for Texas and Florida at three marine leagues, and fixed those of Mississippi, Alabama and Louisiana at three geographic miles. These cases followed earlier challenges to the validity of the Submerged Lands Act of 1953, where Alabama and Rhode Island contested the right of Texas and Louisiana to hold property ceded to them under the act. The Supreme Court dismissed the cases on the ground that Congress had plenary, unlimited power under the Constitution to dispose of the United States property in any way it saw fit.

Naval Petroleum Reserves—Lands within naval petroleum reserves are under the jurisdiction of the Secretary of the Navy, but may not be leased by him without the consent of the President and consultation with the Committees on Armed Services of both Houses of Congress. (Naval petroleum reserves laws were codified by the act of August 10, 1956, 70 Stat. 457, 10 U.S.C., §§7421-7438). In addition, the Secretary of the Interior will not issue leases on lands within one mile of the exterior boundaries of naval petroleum reserves without consultation with the Secretary of the Navy.

Indian Lands—As of 1958 Indian reservations embraced approximately 53 million acres of land in the continental United States. The lands are closed to entry under either the general mining laws or the Mineral Leasing Act. However, Indian lands have been subject to mineral leasing under special acts of Congress since 1891.

The operations of the Federal Government on Indian lands, although complicated by a mass of statutory and regulatory material, have in general followed a pattern akin to that on the public domain. In the case of Indian Lands the government must also consider the discharge of its function as trustee and guardian of its wards. This factor supplies an additional reason for seeking maximum royalty rates through competitive bidding as well as an efficient, nonwasteful production to conserve the oil and gas resources underlying the lands of its charges.

FEDERAL REGULATION

Natural Gas Regulation—With the passage of the Natural Gas Act in 1938, Congress undertook to regulate specified areas of the natural gas industry. The act vests in the Federal Power Commission control of rates and charges of any natural gas company engaged in transporting or selling natural gas for resale in interstate commerce, and requires Commission certification for any construction or acquisition of facilities therefor. Although empowered to establish uniform systems of accounting, require reports, make investigations, and otherwise administer and enforce the provisions of the statute, the Commission is principally concerned with rate regulation and certification proceedings.

Jurisdiction: The Commission's jurisdiction under the act was determined by the Supreme Court in 1954 to extend to sales by independent producers to pipeline companies for transportation and resale in interstate commerce. Subsequent decisions have extended the jurisdiction to almost all independent producer sales with the possible exception of sales directly to consumers or sales of reserves in place. The states retain their jurisdiction over conservation measures affecting natural gas production as long as there is no conflict with the jurisdiction vested in the Commission. At the other end of the pipeline, the Commission's jurisdiction extends to transmission facilities up to the point where the gas is reduced in pressure and enters a local distribution system, where it becomes subject to state supervision and control.

Certification: Operations subject to the Commission's jurisdiction require a certificate of convenience and necessity. Pipeline applicants must show (a) an adequate supply to meet expected demands, (b) the existence of customers in the area to be served, (c) the adequacy of facilities to render full and complete public service in the area to be served, (d) the financial resources to construct the project, (e) the adequacy and reasonableness of costs of construction, and (f) the reasonableness of proposed rates. Independent producer applicants ostensibly must meet the same requirements but the most important certificate requirement is the Commission's power to reduce initial prices. The Supreme Court has ruled that price conditions are required where the initial price proposals are out of line with existing prices or might trigger general price rises under existing contracts containing favored-nation clauses. However, the law is undecided as to the precise criteria applicable for determining the proper price to be certificated. In the General Policy Statement issued September 28, 1960, the Commission set certain price levels for producing areas beyond which certificates would be denied without price conditions. Yet, the Commission recognized in its Statement that the validity of the area-pricing device will be determined only after further lengthy proceedings and litigation.

Rate Regulation: Once certificated, rates may be increased only if "just and reasonable." For pipeline companies rates have been regulated on the traditional original cost, prudent investment rate base method. This normally involves a cost study of a 12 months period with estimate of expected sales and expenses for some months into the future, from which it is sought to derive a just and reasonable rate for future periods. For independent producers, the Commission in the landmark Phillips Petroleum Company decision and General Policy Statement of September 28, 1960, has set forth a program of regulating rates on an "area price" basis rather than the traditional utility rate base method, contending that the value of the gas cannot be determined solely by cost considerations. As in the case of price conditions in initial certificates, the Commission's statement of September 28, 1960, established area price levels governing escalated prices under existing contracts. Proposed increased rates over those specified by the statement will be suspended, but will not deprive any party of his right to submit evidence to show that some other rate is just and reasonable. The Commission states that relevant evidence includes "cost information from all decided and pending cases, existing and historical price structures, volumes of production, trends in production, price trends in the various areas over a number of years, trends in exploration and development, trends in demands, and the available markets for the gas." As in the case of certificate rate proceedings the precise standards for the determination of independent producer rates in any given case are quite unsettled.

In a December 1960 report to President-elect Kennedy, James M. Landis has criticized the Commission for failing to deal with its docket backlog of producer rate cases and its "unwillingness . . . to assume its responsibilities under the Natural Gas Act and its attitude substantially contemptuous, of refusing in substance to obey the mandates of the Supreme Court of the United States and other Federal courts."

Oil Import Controls—As a result of the effects upon domestic oil production and exploration caused by increasing importation of cheap foreign crude oil and the consequent threat to national security, a mandatory oil imports control program was established in 1959. Pursuant to section 2 of the Act of July 1, 1954, as amended (72 Stat. 678, 19 U. S. C. §1352a), the President, by proclamation of March 10, 1959,[1] provided for an import licensing plan to be administered by the Secretary of the Interior and established a schedule of import quotas for designated regions.

In Districts I-IV (the continental United States east of the Rocky Mountains), imports of crude oil, unfinished oils, and finished products, except residual fuel oil to be used as fuel, may not exceed approximately 9 per cent of the total demand in those districts.

In District V (Arizona, Nevada, California, Oregon, Washington, Alaska, and Hawaii), imports of crude oil, unfinished oils, and finished products are limited to an amount which, together with domestic production and supply (including exempt imports by land transportation) will approximate total demand in the district. Within these quotas, imports of finished products other than residual fuel oil to be used as fuel may not exceed the level of imports for 1957, while unfinished oils imports are limited to a percentage (10%) in Districts I-IV) of the permissible imports of crude oil and unfinished oils. Imports of residual fuel oil to be used as fuel, basically limited to their 1957 level, may be adjusted by the Secretary if consonant with the objectives of the program.

Puerto Rico's quota for crude oil, unfinished oils, and finished products is set at its 1957 level.

Crude oil, unfinished oils, and finished products entering the United States by pipeline, motor carrier, or rail from the country of production are exempt from import restrictions, although they may be taken into account in computing the maximum level of imports in Region V.

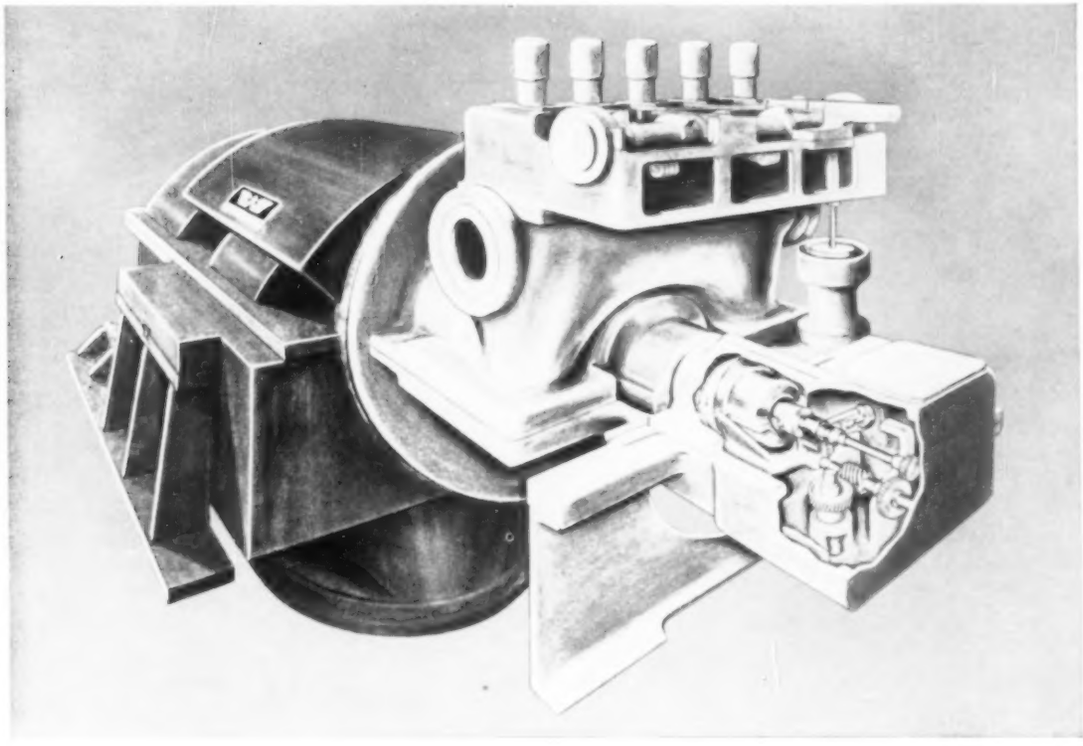
The Secretary of the Interior has issued regulations[2] establishing a licensing system for allocation of the authorized imports which is administered by the Oil Import Administration under the direction of an Administrator designated by the Secretary.

Allocations of all available imports except imports of residual fuel oil to be used as fuel are made for six month periods. In general, to be eligible for an allocation, a person must have made imports prior to the establishment of the program. However, allocations may be made to persons in certain hardship circumstances who do not have an importing history entitling them to an allocation. In addition, baggage entries and imports of small quantities for testing or analysis are permitted without a license. Persons desiring an allocation must file an application with the Administrator in accordance with the procedure detailed in the regulations. Successful applicants are issued a license embodying the terms of the permitted importation. Persons affected by the regulations may petition the Oil Import Appeals Board within the Department of the Interior for relief.

Oil Pipelines—Two acts, the Hepburn Act of 1906 (34 Stat. 584 (1906), as amended, 49 U. S. C. §1) and the Elkins Act of 1903 (32 Stat. 847 (1903), as amended; 49 U. S. C. §§ 41-43) govern oil pipelines. The Hepburn Act subjects companies whose pipelines are used as common carriers to the supervision and rate control of the Interstate Commerce Commission. Private carriers are exempt from the rate control of the Commission

1 Pres. Proc. No. 3279, 24 Fed. Reg. 1781 (1959), as amended by Pres. Proc. No. 3281, 24 Fed. Reg. 3527 (1959), Pres. Proc. No. 3328 (1960), and Pres. Proc. 3386, 25 Fed. Reg. 13945 (1960).

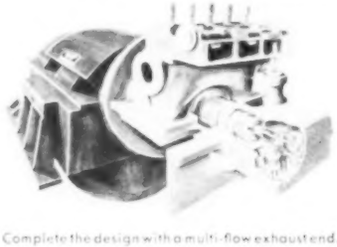
2 Oil Import Regulation 1 (Revision 2), 32A C.F.R. ch. X.



HOW WE ASSURE RELIABILITY IN A NEW DESIGN

1. Use an existing high-speed bearing case and a high capacity thrust bearing.

2. Add a high-pressure steam end of proved design with cam operated automatic nozzle control valves



3. Complete the design with a multi-flow exhaust end.

HOW TO BUILD THE WORLD'S FASTEST 10,000 HP TURBINE

You can order this trail-blazing 15,000 rpm centrifugal compressor-drive turbine today with complete confidence because it makes use of components of proved reliability.

Progress without sacrificing reliability is the goal of Worthington's research in steam turbines. How Worthington's creative engineering and advanced planning work for you is illustrated by the three steps taken in the continuing development of turbines of increasingly high speeds:

1. Wherever possible, use existing components proved reliable by years of operation.

2. Modify designs already in use in other high speed applications.

3. Test these modifications thoroughly to prove their reliability before field application.

Such advances in the turbine art bring new economies to high-speed, high-horsepower compressor drive applications. For further information, contact Worthington Corporation, Dept. 108-47E, Harrison, New Jersey, U.S.A.

WORTHINGTON

WORTHINGTON ASSOCIATED COMPANIES: *AUSTRIA—Worthington Gesellschaft m.b.H., Vienna • ARGENTINA—Worthington Argentina S.A.I.C., Buenos Aires • BRAZIL—Worthington S.A., Maquinas, Rio de Janeiro • CANADA—Worthington (Canada) Ltd., Brantford, Ont. • COLOMBIA—Worthington Limitada, Bogotá • ENGLAND—Worthington-Simpson, Ltd., London • FRANCE—Société Worthington, Paris • GERMANY—Deutsche Worthington G.m.b.H., Hamburg • ITALY—Worthington Societa Italiana Pompe e Compressori, Milan; Worthington International S. p. A., Naples • JAPAN—Nitgata Worthington Co., Ltd., Tokyo • MEXICO—Worthington de Mexico, S.A., Mexico, D.F. • SPAIN—Worthington, S.A., Madrid • VENEZUELA—Worthington International, Inc., Caracas.*

although they must provide the Commission with requested information and follow uniform accounting practices. The Elkins Act forbids common carriers to pay rebates, grant concession or practice discrimination in the transportation of property in interstate commerce. A 1940 action initiated under the act by the Justice Department resulted in a consent decree establishing a 7 per cent maximum annual return from investment for shipper-owners, based on an evaluation of the carrier's property owned or used. Any dividends, earnings, or other payments in excess of the maximum are considered as illegal rebates. Since the decree the Interstate Commerce Commission has undertaken continuous valuation proceedings to value the pipeline property used for carrier purposes which may properly be taken as a basis for measuring the reasonableness of rates.

The Connally "Hot Oil" Act—The Connally Act of 1935 (49 Stat. 30 (1935), 15 U. S. C. §§ 715-715m) prohibits the shipment in interstate commerce of oil produced in violation of state oil and gas conservation laws, regulations, or orders. The act is administered by the Department of the Interior. Since 1946 direct supervision of the enforcement and administration of the act has been the responsibility of the Federal Petroleum Board, presently a part of the Geological Survey. The activity of the Board has been concentrated in Texas and Louisiana, and to some degree in New Mexico, although subsidiary activities are carried on in the five additional states whose laws qualify them for Connally Act assistance: Arkansas, Colorado, Kansas, Mississippi, and Oklahoma. Prosecution of violations of the act, after investigation by the Department of Interior, is carried out by the Justice Department.

Federal Income Tax—Those engaged in the development and production of oil and gas properties are permitted, under federal tax laws to deduct all of the expenses ordinarily permitted other types of business, and in addition, are entitled to special allowances arising out of the particular nature of their business.

Where the exploration and development phases are concerned, the taxpayer has the election to treat his costs as either a capital expenditure to be returned through depletion allowance, or as a current expense. Most operators elect to use the latter method. With regard to intangible costs such as labor, supplies, fuel, surveys, etc., the election to treat as a current expense applies, but tangible costs, i.e. equipment and personal property having a salvage value, are recoverable through depreciation rather than depletion. Alternate methods of depreciation, other than the "straight line" method, are available to the taxpayer engaged in the wasting aspect of a natural resource. Geophysical and geological costs may be recovered only if the property worked is classified ultimately as non-productive.

In the operation phase of oil and gas properties, owners were given the opportunity to take a depletion allowance on the basis of value at the time of discovery in lieu of cost. The purpose of this theory was to stimulate oil and gas discoveries, but experience soon indicated that it was impossible to accurately determine the value of an oil and gas property at time of discovery.

The Revenue Act of 1928 provided for an alternate method of calculating depletion based on a percentage of income as a substitute for the discovery value method. Present tax laws provide for a percentage depletion of 27.5 per cent of the gross income derived from a property up to 50 per cent of the net income from the same property. If the producer so desires he may take his choice each year as to the method of calculating depletion, for he is entitled to utilize whichever method yields the greatest benefit.

END

CANADA

The future of the Canadian oil industry is bright, with an expenditure of $639 estimated for 1960, and about $769 million expenditures estimated for 1961 (estimates by Canadian Petroleum Association).[1]

EXPLORATION: No major discoveries were made in Canada during 1950, but the industry continued to make a series of small lucrative discoveries. In Alberta, the most important of the oil producing provinces, exploration and development spending is estimated at $405 million in 1960 and expected to jump to $450 million in 1961. Total 1960 footage will surpass 9.5 million, highest sinco 1957.

During the ten-month period of 1960, there were 309 oil wells brought in at Pembina, 127 in Swan Hills, 49 in Virginia Hills and 64 from other fields and areas of Alberta.

Swan Hills oil field (Home Oil Company, major interest holder) in northern Alberta is now producing on an average of 14,600 b/d and recorded production of more than 5 million bbls. in 1960 compared to 1.8 million bbls. in 1959. It is now the fourth largest oil field in the province.

Among other significant oil discoveries in Alberta (with participants in brackets) are Carstairs-Crossfield area, 40 miles north of Calgary—13 straight oil successes (a team including Canadian American Royalties Limited and Comick Petroleums Limited); Chip Lake District, 13 mi. north of Pembina field near Edmonton (Hudson's Bay Oil & Gas Co. & Imperial Oil Limited); and Caribou Mountain area in extreme northern tip of the province (Crusade Petroleum Corp. Ltd., Pan-American, Mobil, and Tennessee Gas).

PRODUCTION: Crude production in Western Canada during 1960 averaged a record 522,000 b/d, an increase of 6.9% over 1959. All Provinces except Manitoba shared the gain, principally Alberta, which moved ahead by 30,000 b/d or 8.5%. Saskatchewan had a 7.5% improvement and now accounts for 26.3% of Western Canadian output. With domestic refiners nominating an average of 415,000 b/d during 1960, this left about 129,000 b/d for export to the U. S. A. This was an increase of 41.8% over the previous year.

Natural Gas: 1960 will be remembered as the "take-off" year for natural gas in Western Canada due to the authorization of large-scale exports by both Canadian and U. S. authorities. To date, natural gas has contributed less than 4% to the total revenue of producing operations in Western Canada. Within the next ten years this contribution will be raised to 25% and in absolute terms should exceed $250 million annually. On the basis of those new export volumes and domestic demand, reserve requirements have been estimated to be 49.7 trillion c.f. (cubic feet). Of this, 30.6 trillion c.f. will be needed for domestic markets over the next thirty years and another 9.0 trillion for U. S. markets presently authorized. To this must be added another 10.1 trillion c.f. for deliverability, bringing the total to 49.7 trillion c.f. Present proven reserves are estimated to be about 30.0 trillion c.f., but calculations of ultimate recovery run as high as 300.0 trillion c.f., of which Alberta has 50%.

Estimated Ultimate Natural Gas Recovery in Western Canada
(Trillions of c.f.)

Manitoba and Saskatchewan	5
Alberta	150
British Columbia	75
N.W.T. and Yukon	70
Total	300

REFINING: Canada during 1960 had a comparatively quiet construction year, highlighted by the spring completion of two new refineries in Eastern Canada. These contributed 65.0 of a total 74.5 mb/d crude handling additions during the year. By mid-year there were no major refinery construction projects underway, for the first time in many years. This is partly explained by the general slowing down in the rate of increase of product demand noticeable since 1957, and also by the degree of overbuilding of the last few years.

Canadian Refining
(Thousands of Barrels Per Day)

	1959	1960
Crude capacity at year end	882.3	956.8
Crude Runs	734.0	770.3[1]
Per Cent Utilization	83.2	80.5

[1] Partly estimated

MARKETING: Consumption of products recorded a modest 4.1% gain during 1960. Motor gasoline and light fuel oil were up 3.8% and 4.7% respectively, while heavy fuel oils were even. This latter group is probably feeling the effect of industrial gas sales in Eastern Canada now that both Montreal and Toronto have access to Alberta gas. The 5.2% gain in other products reflects the steady improvement in aviation fuel demand and the increasing emphasis on asphalts and other specialty products which sustain profit margins more readily in times of severe competition. Price wars in retail gasoline markets and aggressive natural gas marketing techniques, have taken much of the gilt off the light end of the product barrel in recent years.

OIL LAWS

During 1960, the Federal government set down the ground rules for oil and gas exploration and development of Canada's great virgin northland. Initial options indicated considerable interest in the land but once the rules were spelt out in detail, much of the bloom faded.

For a detailed and highly regarded study of petroleum industry legislation and regulation within Canada, the editor highly recommends *Petroleum Legislation*. This is a legislative reference service containing a summary and analysis of the oil laws and other industry regulation for every major country of the world. The national sections are prepared by legal counsel recommended by oil companies who have actually operated within the country concerned. The same oil firms keep their reviews up to date by looseleaf revision service. For information on this excellent service, the publisher may be contacted directly at: *Petroleum Legislation Ltd., Post Office Box 1591, Grand Central Station, New York 17, New York.*

NATIONAL FACTORS

The two major forces at work on Canadian petroleum policy in 1960 were the pressures from the entire industry for natural gas exports to the U. S. A., and the pressures from a group of independent producers for addditional crude markets in Eastern Canada. This almost invariably involves mention of the proposed oil pipe line to Montreal. The natural gas picture was finally clarified on both sides of the International border by September, and plans were announced to proceed immediately with the vast construction programmes involved. END

[1] Review by Dr. E. C. Sievwright, Economic Research Corp., Toronto, Canada.

USSR *and other Communist Countries*

RUSSIA

The Soviet Union is rapidly developing its energy production to expand its role as an exporter of energy. It became a net exporter of 21 million tons (402,000 b/d) of crude in 1959, and may achieve an export potential of 40 million to 50 million tons (800,000 b/d to 1,000,000 b/d) by 1965. Not to be overlooked is the active expansion of Soviet participation in oil exploration and development in underdeveloped countries.

EXPLORATION: The basic exploration area available to the Soviets is very large. Petroliferous territory which could contain oil covers about three million square miles, more than double the entire likely hunting ground in the United States. Only about 50,000 wells have been drilled, compared with about 1.6 million wells in the United States. If the two areas' ultimate reserves are about the same, in the neighborhood of 200 billion, the Soviets have produced only about 6% of their oil, while the USA has already produced over 31% (62.9 billion barrels) of its ultimate reserve. Comparing the two countries, the Soviet Union is about where the USA was in 1929; but it is starting at that 1929 level with 1960 oil tools in geophysical, drilling, logging, and geology.

PRODUCTION: Crude production in 1960 was to have reached 148 million tons (approximately 2,960,000 b/d) thus increasing the USSR's share in world oil production to 14%, from 7.2% in 1950. The rate of growth in production has climbed from 19.4 million tons (388,000 b/d) in 1945, the year of the war's end, to 37.9 million tons in 1950, to 70.8 million tons in 1955, and to an estimated 148 million tons in 1960. Plans call for 4,800,000 b/d in 1965.

Gas production at the same time is projected at 14.5 billion cubic feet per day, about 26 times 1950 rates. This would put them, in 1965, on a level roughly comparable with the United States in early 1945.

Costs: The Seven-Year Plan envisages capital expenditures of about $20 billion in the production end of the business (exclusive of housing, hospitals, etc.)—$14 billion on drilling alone (1 ruble = 25 US cents). Assuming that total additions to reserves will be the equivalent of 33.4 billion barrels [20-year life, 27.8 billions barrels of crude, 5.5 billion barrels of crude-equivalent, 20 mcf of gas = 1 bbl of crude], finding and developing capital costs of 60 cents per barrel are indicated.

Reserves: For strategic reasons, the USSR is highly secretive about figures concerning reserves, production costs, etc. The most recurrent figure in Soviet literature concerning reserves is 3.23 billion tons (23.5 billion barrels) of proved and seven to eight billion tons (50.8 to 58.1 billion barrels) of probable crude reserves. Recoverable gas reserves are estimated at 35,300 billion cubic feet, the most important areas being in the Ukraine, at Kuybyshev, Saratov, Astrakhan, Krasnodar, Staveopol, and Gazli.

The Russians compute both recoverable (proved) and geological reserves, but their method results in a larger current figure for recoverable reserves than in the USA. When a field is found, they cross-section it with stepout wells (called exploratory) defining the water level, productive area, acre-feet, and amount of recoverable oil before starting the development program. USA figures start out with a small figure, and through the years are raised as drilling progresses and production history is obtained. The Russians revise their figures to a lesser extent. Also, these "exploratory" wells improve their exploratory-well "success average" greatly.

The oil expert of the State Economic Council, Maksimovich, stated that the Russians produce their wells at the average rate of 4% of the proved reserves per year. At Stalingrad, 4% was used for the larger fields and 10% for the smaller. The figure of 22.5 billion barrels (3.1 billion tons) is close to a figure of over three billion tons given by one of the Soviets.

REFINING: Primary throughput capacity has increased from 52.3 million tons in 1941 to 112.5 million tons in 1959; at the same time the number of plants has decreased from 170 to somewhat more than 70. Between 1959 and 1965, primary capacity is to increase by 45 million tons and cracking capacity by 25 million tons.

USSR—Oil Statistics

	1950	1958	1965*
Production crude oil (1,000 b/d)	758	2,260	4,800
Production dry gas (m.m.c.f. daily)	557	2,728	14,513
Refining capacity (1,000 b/d)	942	2,562	4,548
Crude runs (1,000 b/d)	726	2,080	4,280
Refined products (1,000 b/d)	668	1,914	3,940
Net exports (1,000 b/d)	57	†277	N.A.
Oil trunk pipelines (miles)	3,381	9,253	27,945
Gas trunk pipelines (miles)	1,800	7,452	23,598
Footage drilled (1,000 ft.)	14,052	22,596	52,496
Exploratory	6,980	11,054	34,122
Exploitation	7,072	11,542	18,374
Geophysical parties	279	785	N.A.
Seismograph	118	447	1,200
Core drill footage (1,000 ft.)	3,698	——	——

*Estimates from 7-year plan and other publications. †63,700 b/d crude and 105,360 b/d products to Free World. Net exports for 1959 were 419,000 b/d; 109,000 b/d crude and 158,900 b/d products to Free World.

USSR—Exports (Thousands of Barrels) Crude Oil

Year	To Free World	To Communist Nations	Products All Sales
1955	6,086	15,000	38,187
1956	9,434	19,208	46,202
1957	10,704	30,958	58,011
1958	27,824	35,359	67,527
1958	48,021	43,746	95,475

Russian exports to Latin America totaled 7,221,000 bbl (a little less than 20,000 b/d) in 1959, compared with 265,000 b/d to Eastern Hemisphere Free World destinations.

TRANSPORTATION: Storage facilities are inadequate in the Soviet Union. During the Seven-Year Plan, Russia plans to build almost 19,000 miles of oil trunk lines, 40% of which will be product lines.

MARKETING: Exports of crude and products have increased from 1.5 million tons in 1940 to 5.0 million tons in 1955, and 26 million tons (502,000 b/d) in 1960. Between 1957 and 1960, exports almost doubled. About half of the exports go to satellite countries, and at present the USSR is covering 97% of its satellites' crude requirement. Prospects for an expansion of exports are considered "quite favorable." The USSR's rapid expansion of crude and products shows up best in its balance of trade. According to latest available data, exports of crude and products in 1959 accounted for 10.4% of the total export value, which amounted to US $10.5 billion. END

ALBANIA

Oil has become a major industry in Albania, with the aid and almost complete management of the Russians. Exploration news is sketchy and unreliable; but, under an intensive development plan, production rose to over 11,000 b/d (preliminary estimate) in 1960. The third Five-Year Plan, to start in 1961, calls for an increase to 40,000-50,000 b/d by 1965. Despite an unexplained sharp decrease in 1958, production has generally been climbing—from about 2,413 b/d in 1938 to 8,953 b/d in 1957; 7,370 b/d in 1958; and official figures report a crude production of 479,400 metric tons (9,588 b/d) in 1959.

The Czech monthly *Zahranicni Obchod* reported Albanian reserves at 100 million metric tons during 1960 (about 700 million barrels). This figure would put Albania in third place in Europe, following the USSR and Romania.

BULGARIA

EXPLORATION AND PRODUCTION: Petroleum production in 1960 is estimated at 188,000 tons (3,742 b/d),[1] about 10% less than in 1959 (192,000 tons) and 16% less than in 1958 (222,000 tons). This output comes from the country's only field at Tyulenovo, on the Black Sea coast. Exploration in 1960 was carried out with new Romanian and Soviet drilling rigs in the north (Pleven), northwest (Vidin and Mikhailovgrad), and northeast (Tolbukhin) of the country. A test for gypsum at Zlaten Rog (near Vidin) discovered gas at 387 ft. Footage of deep holes is to increase to 442,940 ft in 1965 from 72,180 ft in 1958.

Reserves: Proved crude-oil reserves, as of January 1, 1960, were 2.3 million tons (about 16.7 million barrels).

REFINING AND MARKETING: Part of the Tyulenovo crude, which yields no gasoline, is processed in two small plants at Russe. Domestic production and refining are insufficient to cover demand.

Much of Bulgaria's crude has to be exported for lack of refining capacity. Export of crude

[1] Conversion figure used is 7.265 barrels per metric ton.

and products in 1960 was 60,000 tons (1959: 81,000 tons); imports were 905,000 tons (1959: 734,000 tons).

Construction began in August 1960 of a 20,000 b/d refinery at Burgas. Russia designed the plant and granted a 130-million-ruble loan for its construction. Completion of the plant, which will receive its crude from the Soviet Union via the Black Sea, is scheduled for 1963. END

COMMUNIST CHINA

EXPLORATION: An intensive drive for oil is underway, with the deputy minister for the oil industry reporting in 1959 that 916 exploration rigs were active in China during 1959 and 480 modern drilling rigs which drilled over 5.5 million feet of hole. 1960 production is estimated at 100,000 b/d.

The so-called "People's Republic of Mongolia," another Soviet satellite, produced about 50,000 metric tons of crude in 1956 (about 1,000 b/d), and has improved on this output since then, according to Russian sources.

REFINING: The 20,000 b/d Lanchow refinery, the country's biggest, went on full-scale operation in January 1960.

MARKETING: Consumption is estimated at about 124,000 b/d, including oil from shale and coal. The deficiency over production is supplied by imports from the Soviet Union. END

CZECHOSLOVAKIA

EXPLORATION AND PRODUCTION: Oil is produced at Gbely and Hodonin (western Slovakia) and at Mikalovce and Zemplin (eastern Slovakia). Gas is produced at Secovce, Liskovce, Lab, and above all, at Vysoka. Average depth of wells is 5,118 ft to 5,850 ft; but wells of 8,200 ft, and even 9,840 ft, are on the increase. Two-thirds of all wells are in production. While crude output is increasing only slightly [it was about 130,000 tons (2,416 b/d) in 1960 against 123,000 tons (2,285 b/d) in 1959], gas production has risen sharply in recent years (see table).

Natural Gas: In 1958, the last year in which gas-output figures were reported, Czechoslovakia produced more gas than Austria. Since this could only be achieved by forced production of the Zwerndorf-Vysoka field, of which only one-sixth lies on Czechoslovak territory, Austria concluded an agreement which regulates the production of gas of both countries from the common field.

REFINING: The country's seven refineries (at Prague, Kralupy, Kolin, Pardubice, Moravska Ostrava, Bratislava, and Zaluzi) processed in 1960 2.4 million tons (48,000 b/d) of crude (1959: 2 million tons), of which 5.5% (1959: 6%) came from domestic sources. END

CZECHOSLOVAKIA—Gas and Oil Production

Year	Crude Production (in 1,000 tons)	Gas Production (in 1,000 cubic meters)
1954	125	125,000
1955	107	121,527
1956	108	226,637
1957	108	684,030
1958	106	1,135,971
1959	123	n.a.
1960 (Est.)	130	n.a.

EAST GERMANY

EXPLORATION: Eastern Germany is a much poorer and less industrialized region than Western Germany. Most of energy requirements in East Germany are supplied by brown coal, and oil production is very low. No accurate figures are available, however about 1,700 barrels per day were produced in 1960.

REFINING: There are no crude oil refineries in the country at present, but a 40,000 b/d plant is being built at Schwedt-on-Oder for 1963 completion with Russian help and materials.

TRANSPORTATION: A crude pipeline is to be built from the Soviet Union across Poland to the German Soviet zone terminating at Schwedt, on the left side of the Oder River. Starting in 1965, the East German zone is to get from the Soviet Union about 4.8 million tons of crude yearly (about 96,000 b/d). It is to be processed in the Schwedt refinery. Poland will build a refinery at Plock, which will also be supplied with Soviet crude by pipeline. END

HUNGARY

EXPLORATION: Target for drilled footage in 1960 was 1.38 million feet (1959 totaled 1.25 million feet), of which 165,000 feet were to be drilled with Soviet turbodrills.

Natural Gas: Natural gas supplies 15% of Hungary's energy production. There are 4 gas-producing areas: Hajdusag; Totkomlos-Oroshaza; southern Zala; Babocsa and Gorgeteg. A 120 mile gas pipeline is being laid from Hajduszobozlo (near Debrecen) to the capital.

Reserves: Latest estimates of reserves was 11 million tons (82.5 million barrels) of crude oil and 318 billion cubic feet of gas.

PRODUCTION: Production in 1960 was planned to be 1.2 million metric tons (24,000 b/d) of crude oil (1959 production was 1,036,000 tons) and 7.73 billion cubic feet of gas (1959 was not reported). In 1965 petroleum production is to increase to 1.7-1.8 million tons (34,000 to 36,000 b/d). Cumulative production since 1938, when commericial exploitation began, is 16,065,000 tons of crude oil and 271.21 billion cubic feet of gas.

REFINING: Hungary's six refineries (at Almasfusito, Budapest, Czepel, Petfurdo, Zalaegerszeg, and Szony) processed two million tons (40,000 b/d) of crude in 1960.

MARKETING: Consumption of petroleum products totaled about two million tons in 1960 (about 40,000 b/d) and is covered half by domestic resources, half by imports. END

CRUDE OIL PRODUCTION IN HUNGARY
(in metric tons)

1937	2,543	1949	497,000	
1938	42,797	1950	512,000	
1939	143,791	1951	499,000	
1940	250,417	1952	598,000	
1941	422,138	1953	846,000	
1942	665,631	1954	1,118,000	
1943	838,000	1955	1,601,000	
1944	810,152	1956	1,202,149	
1945	655,777	1957	672,000	
1946	674,772	1958	829,000	
1947	569,633	1959	1,036,000	
1948	483,000	1960	1,200,000	(Estimate)

POLAND

EXPLORATION: Footage drilled for oil and gas in 1960 was 569,719 feet (rotary: 567,285 feet; cable tool: 2,434 feet) of which 189,910 feet were drilled for geological information; exploration, 272,630 feet; production, 34,974 feet; others, 72,182 feet. Average drilling progress of rotary rigs was 1,040 feet per rig per month.

PRODUCTION: Crude output in 1960 was approximately 193,200 tons (about 3,864 b/d), a slight increase over the 1959 level of 174,900 tons. There were some 3,000 wells in production. The bulk was produced from structures between 1,740 feet and 2,300 feet. Seventy percent of the crude came from 800 wells drilled after 1945.

Natural Gas: Natural gas production in 1960 increased by 25% to 18.71 billion cubic feet, from 14.97 billion cubic feet in 1959. This was largely due to exploration advances in southeast Poland. The present gas yield covers about 65% of requirement. By 1965 the gas yield is to increase to 35.31 billion cubic feet.

REFINING: The country's five refineries processed in 1960 894,806 tons of crude (Jedlicze, 176,700 tons; Jaslo, 173,212 tons; Glinek Mariampolski, 165,114 tons; Trzebinia, 319,702 tons; and Czechovice, 60,078 tons).

Because of the increase in demand—it is estimated at 3.5 million tons in 1965—a refinery is being built at Plock, which eventually is to cover 70% of demand. Its capacity is to be 40,000 b/d in 1964, and 120,000 b/d in 1967. END

Extra copies of World Petroleum Report 1961

A limited number of extra copies of World Petroleum Report 1961 are available at $10 per copy. Hard cover editions with gold stamp may be obtained for $5 additional for library or other permanent reference use.

Orders may be addressed to:

WORLD PETROLEUM REPORT
c/o Order Dept.
25 West 45th St., New York 36, N. Y., U.S.A.

ROMANIA

EXPLORATION: 1960 drilled footage is estimated at 2,385,600 feet (with 65% for exploration). Between 1955 and 1960 geological prospecting was carried out in the value of eight billion lei (US $1.3 billion); between 1961 and 1965 exploration is to increase by 70%. Past results have been unsatisfactory, and in the future, exploratory activity is to concentrate on the most prospective areas at Craiova, Pitesti, and Bucharest.

PRODUCTION: In 1960 were produced about 11,565,000 tons (231,300 b/d) of crude (1959: (11,438,000 tons); 225.4 billion cubic feet of gas (1959: 204.2 billion cubic feet), and 85 drilling rigs (1959: 72). By 1965, production is planned to increase to 12.2 million tons of crude, 469,-600 million cubic feet of gas, and 135-140 drilling rigs. The rate of increase in crude production is slowing down.

Reserves: Since Romania seems to apply the same production coefficient as the Russians (annual output is 5%-7% of industrial reserves), reserves should amount to 190 million tons. It has been recommended recently that a more careful production policy should be applied and that the percentage of annual output should not exceed 4% of industrial reserves.

TRANSPORTATION: Oil and products lines transported in 1959 4.54 million tons (1958: 3.70 million tons). The gas pipeline network is to increase during the next five years by 900 miles to 2,490 miles. At present under construction are the gas mains Arad-Timisoara, Resita-Hunedoara, Bucharest-Ticleni, Saros-Bicăz-Roman, Bicaz-Darmanesti-Onesti-Borzesti. At present 85% of the gas is utilized, in 1965 only 5% is to be flared.

REFINING: The country's crude is all processed locally, only products are exported. The 11 refineries have a primary capacity of 11.7 million tons per year (23,400 b/d) (1955: 10.5 million tons, 1938: 8.5 million tons) and a cracking capacity of 3.8 million tons (1955: 3 million tons, 1938: 1.4 million tons). END

YUGOSLAVIA

EXPLORATION: Crude oil production is increasing fast: from 592,485 tons (11,850 b/d) in 1959 to an estimated 1.2 million tons (24,000 b/d) in 1960, and a planned 2.2 million tons (44,000 b/d) in 1965. This is due chiefly to the putting into production in May 1960 of Yugoslavia's richest field so far at Struzec (Croatia). Figures concerning its reserves vary between 10 and 25 million tons (70 to 175 million barrels).

Natural Gas: Gas output increased in 1960 to an estimated 1,925 million cubic feet, from 1,765 million cubic feet in 1959. Gas was discovered at Boca, Plantiste, and Begejac. With a $23 million loan from the United States' Economic Development Fund, Yugoslavia's first petrochemical plant will be built at Zagreb. It will use gas from the Struzec oil field as raw material.

REFINING: The country's three refineries (Bosanski Brod, Rijeka, Sisak) processed in 1960 1.21 million tons (24,000 b/d) of crude (1959: 1,175,616 tons). END

CRUDE OIL PRODUCTION IN YUGOSLAVIA

(in metric tons)

1939	1,100	1955	257,204	
1947	33,245	1956	293,680	
1948	36,498	1957	394,900	
1949	63,240	1958	462,000	
1950	110,343	1959	592,485	
1951	148,133	1960	1,200,000	(Estimate)
1952	151,537	1965	2,200,000	(Plan)
1953	172,076			
1954	216,267			

International Oil Intelligence
as contained in

WORLD PETROLEUM REPORT NEWSLETTER

Need your oil news fast? accurate? compressed?
Truly international in scope, to match an international industry?
This new international oil newsletter offers the following advantages:

1 **It compresses the oil news, saves you time, packs all the news in four pages with no extraneous material;**

2 **Coverage is primarily *international*—and more international news is contained than in any other source;**

3 **Airmailed, it arrives *anywhere in the world* within a few days of publication;**

4 **Every year an annual summary of all events is mailed free to subscribers—The issue in which this appears is an example.**

These are only a few of the advantages of WORLD PETROLEUM REPORT'S airmailed oil newsletter. It may be received free, without any obligation, for two months on a trial basis. Just address your order or request for a trial subscription to:

Order Department
WORLD PETROLEUM REPORT
25 West 45th Street, New York 36, New York

Completely New!

Sixth Edition
BRANTLY ROTARY DRILLING HANDBOOK

For the sixth time in the past quarter of a century J. E. Brantly and his staff of expert engineering editors have completely rewritten the Brantly Rotary Drilling Handbook to cover new developments in the equipment and technology of drilling.

The new edition is more than 20 percent larger than its most recent predecessor. Illustrations including practical nomographic charts and performance curves have been increased from 122 to 603 in the new edition.

Bound in sturdy black fabricoid with rounded corners for long service at the rig as well as in the office, **the new sixth edition is now ready for shipment at $12.50 per copy, postpaid.**

Order from:

PALMER PUBLICATIONS
25 West 45th St., New York 36, N. Y.

FAR EAST

AUSTRALIA

EXPLORATION: *1960 Activities:* A steady program of prospecting in Australia and the Australian territory of Papua failed to find flow oil, but significant discoveries of petroliferous gas were made in the state of Queensland. During the year an effort was made to establish the importance of a gas flow in Victoria late in 1959.

Emphasis on the search for oil swung away a little more from Western Australia—where it had been largely concentrated since the brief discovery of flow oil in 1953—to the eastern half of the continent, and to New Guinea.

West Australian Petroleum Pty Ltd. completed its Barlee No. 1. well, 120 miles north east of Broome, at 8101 ft. WAPET is owned two-sevenths by Standard of California, two-sevenths by Texaco, two-sevenths by Shell and one-seventh by Ampol. The company reported that a comparison of results at a zone without prospects. Earlier in the year the company completed a dry well, Thangoo No. 1A, at 5,429 ft. also near Broome.

In the south of Western Australia, Exoil Pty Ltd. (a subsidiary of Oil Drilling & Exploration Ltd.) completed two dry holes in the Eucla Basin—Eyre No. 1. at 1,714 ft. and Gambanga No. 1. at 1282 ft.

The Northern Territory saw two drilling operations for the year. Oil Development N.L. took over the Spirit Hill (Bonaparte Gulf Basin) from Westralian Oil Ltd. and is drilling below 3,000 ft. Oil Development has also spudded-in a deep well on Bathurst Island, off Darwin.

In Queensland Cooroorah No. 1. well in the Bowen Basin was completed at 3,523 ft. without significant traces of oil. The well was a joint venture of Associated Freney Oil Fields N.L., Associated Australian Oilfields N.L. and Papuan Apinaipi Petroleum Co. Ltd. This group transferred activities to the Roma district and drilled the Timbury Hills No. 2. well to 4,400 ft. obtaining some gas. Twenty miles from Roma, the group put down the Pickanjinnie No. 1. well and struck a gas flow of 6,500,000 cu. ft. a day, strongest flow yet encountered on the Australian mainland. This was followed by Latemore No. 1. which produced 600,000 cu. ft. a day and Latemore East No. 1. with 200,000 cu. ft. a day. More holes are planned for this area.

Betoota No. 1. well, in south-west Queensland, drilled by the Santos-Delhi-Frome group, was completed at 9,824 ft. without any traces of oil being met. In the extreme south-east of Queensland, at Beaudesert, near Brisbane, Queensland American Oil Co. drilled a "dry" stratigraphic test well below 2,750 ft.

In Victoria, Frome-Broken Hill Co. Pty Ltd., (owned by Vacuum, BP Exploration, and Interstate Oil), followed up its strike of gas flowing at the rate of 2,500,000 cu. ft. a day at Port Campbell No. 1. well in December 1959. In July the company spudded-in Port Campbell No. 2. also in the Otway Basin. After the drilling tools became stuck at 8,364 ft. the company began a side-track hole below 5,000 ft.

At Rosedale in the Gippsland area of Victoria, A.P.M. Development Pty Ltd. (subsidiary of Australian Paper Manufacturers Ltd.) drilled a stratigraphic well to 5,836 ft. without trace of oil or gas.

New South Wales drilling operations were confined to Australian Oil and Gas Corp. Ltd. which completed Mulgoa No. 2. well at 5,630 ft.—deepest well so far in the Sydney Basin. The same company completed tests on Camden No. 10 well and drilled Camden No. 11. to bed rock at 1950 ft. Small quantities of gas were found.

PRODUCTION, REFINING, MARKETING: There is no production. Oil now supplies 37.8% of primary energy requirements in Australia. This is an increase of nearly 8% in the last four years.

Total consumption for 1960 is estimated at 84,847,000 barrels, or 232,458 barrels daily, an increase of 10% over the previous year.

OIL LAWS

There were no significant changes in Australia's oil laws during 1960. A new oil law is being considered for Queensland, but is still in the formative stages. For an accurate and concise review of Australian oil regulation in all the states of Australia prepared by counsel within the state concerned recommendation is made of *Petroleum Legislation*. This legislative reference work for oil is contained in several volumes and also covers all other countries of the world. Its oil legal reviews are compiled by law firms that have been recommended by oil companies operating in the country and state. These same firms keep their reviews up to date by loose-leaf revision service. Inquiries on this legal reference service should be addressed to the publisher directly as follows: *Petroleum Legislation Ltd., Post Office Box 1591, Grand Central Station, New York 17, New York.*

NATIONAL FACTORS

The sum of factors affecting investment in Australia is favorable, despite the complexity caused by differing legal regulation in the various states. Taxation is an important point, and a detailed study of taxation of petroleum in Australia has been prepared and will be available during early 1961 under the title of *"International Taxation Series."* This world-wide series is devoted exclusively to petroleum taxation, covering every type of tax imposed on petroleum operations in all states. Marketing, refining, transportation, exploration and production taxes are covered, with a separate study of each. For an example of one of these national studies (all are prepared in exactly the same format) readers are referred to the Colombia section of this issue of World Petroleum Report, that section entitled *"Colombia-Petroleum Industry Taxation."* Requests for information on the entire series should be addressed to *"International Taxation Series," Post Office Box 1591, Grand Central Station, New York 17, New York.* END

LAOS

There is no refining, or production. Oil activities have been completely stopped by the country's internal warfare.

Laos contains an easterly extension of the Korat plateau sedimentation of northeast Thailand. Red Triassic sandstones and conglomerates predominate the known section, with some partly lignitic shales in depth. Salt springs suggest possible deep evaporites, and sub-Triassic possibilities are unknown. END

NEW GUINEA

No exploration was conducted in 1960 and NNGPM, the Netherlands New Guinea Petroleum Company, in which a 40% interest each is held by Stanvac and Royal Dutch/Shell, and 20% by Caltex, decided to give up exploration and to confine itself to producing the existing fields. The Netherlands government has been notified of the surrender of the greater part of the 100,000 square mile concession, operative on April 15th. Only the producing areas at Klamono, Wasian and Mogoi, and some small surrounding territories, all in the Vogelkop Peninsula are being retained.

REFINING AND MARKETING: There is no refining and very little local demand in this isolated region.

OIL LAWS

Entire text of the oil legislation of Western New Guinea has been published in a noteworthy collection, *"Asia and Australasia—Basic Oil Laws and Concession Contracts."* It is a word-for-word compilation of applicable laws, an interesting and useful collection which includes oil regulation for the other countries of Asia and Australasia as well. For information address inquiries directly to its publisher, *Petroleum Legislation Ltd., P. O. Box 1591, Grand Central Station, New York 17, N. Y.* END

NEW CALEDONIA

No work is in progress. Ste. de Réchèrches et d'Exploitation de Pétrole en Nouvelle-Caledonia, French company, has suspended work on this Pacific island. A new study of the information obtained is planned before deciding on future activities. END

SINGAPORE

There is no exploration or production. Shell Co. of Singapore will build a new 20,000 b/d refinery. The company already has Southeast Asia's largest storage, blending, and distribution facilities on the island. END

BRITISH BORNEO

Operations in British-held territories of Sarawak, Brunei, and North Borneo are described in detail in WORLD PETROLEUM REPORT 1960. For the first half of 1960, accurate information is contained in a release by the Shell group on its worldwide activities, the British Borneo content of which is summarized in accompanying tables.

OIL LAWS

Entire text of the oil legislation in Sarawak, North Borneo, and Brunei has been published in a noteworthy collection, "*Asia and Australasia—Basic Oil Laws and Concession Contracts.*" It is a word-for-word compilation of applicable laws which includes the recent concession documents for Shell in this area and oil regulation for the other countries of Asia and Australasia as well. For information, inquiries should be addressed directly to the *publisher, Petroleum Legislation Ltd., P. O. Box 1591, Grand Central Station, New York 17, N. Y.*

END

SHELL GROUP OPERATIONS IN BRITISH BORNEO
(First Half 1960)

Name of Company	BRUNEI BRUNEI SHELL PETROLEUM COMPANY LIMITED	BRUNEI BRUNEI SHELL PETROLEUM COMPANY LIMITED	SARAWAK SARAWAK SHELL OILFIELDS LIMITED
Name of Field (or producing area)	SERIA	JERUDONG	MIRI
Year of Discovery	1929	1955	1911
Footage drilled during period	37,671	—	—
Number of wells completed during period a. Oil wells	5	—	—
b. Gas wells	—	—	—
c. Dry holes	2	—	—
d. Suspended	—	—	—
Number of wells actually drilling at end of period	1	—	—
Number of drilling wells suspended at end of period	3	—	5
Number of flowing wells at end of period	120	2	—
Number of pumping wells at end of period	29	—	179
Number of other artificial lift wells at end of period	187	—	—
Total number of wells drilled to end of period	529	9	618*
Producing depths at end of period in feet	834-10201'	3523-4021'	300-6270'
Gross clean crude production during period in barrels	17,211,357	60,371	214,857
Average production during last month of period in b/d	91,647	327	1,153
Cumulative production up to end of period in barrels	502,397,664	470,177	75,724,694
Base of crude	Mixed	Mixed	Mixed
A.P.I. Gravity of crude	10-48°	40-42°	17-46°
Age and type of producing formation	Tertiary sands	Tertiary sands	Tertiary sands

The above data does not include exploration wells Engkabang-1 drilled to 11,068', Engkabang-2 drilled to 1600' (Sarawak Shell Oilfields Limited) and East Jerudong-1 drilling at 9154' (Brunei Shell Petroleum Company Limited).
*Includes 9 twin wells.

BURMA

EXPLORATION: The only company active in the search for additional oil reserves in Burma during 1960 was The Burma Oil Co. (1954) Ltd., a partnership between the old-established British-owned Burmah Oil Company Ltd. and the government of the Union of Burma. During the year the government increased its holding in the £15 million joint oil venture to 51% and in Rangoon in October the partners signed an agreement providing, inter alia, for an expansion of industry operations, both field and refining, in the country. Projects to be implemented include the expansion of the Syriam refinery, near Rangoon, the laying of a submarine products pipeline connecting Syriam to the installation at Dunnedaw on the Rangoon river, and the intensification of oil prospecting. The agreement also provided for the marketing services and facilities of the trading company, The Burmah Oil Co. (Burma Trading) Ltd., to be taken over in due course by the "1954" company.

In the Chauk/Lanywa oilfield in central Burma 24 field development wells and two deep tests were completed in 1960. The year also saw the return of drillers to the Yenangyaung field where four development wells were completed. Crude production from Yenangyaung is barged down the Irrawaddy to Syriam refinery, while output from the Chauk/Lanywa field is refined at Chauk.

The company's program of exploration work in central and lower Burma resulted in the discovery of gas at Payagon No. 1, in the Irrawaddy Delta, early in 1960 and plans were made to drill further wells in this area to assess the importance of the find. Operations here, at Kyun Nyogi, and at a number of other locations earmarked for test drilling were, however, held up through delays in the issue of licenses, but late in the year preparations for renewed drilling at Payagon and for initial deep tests at Tharrawaddy (north of Rangoon) and elsewhere were going forward.

No new discoveries of oil outside the existing oilbearing regions were made in 1960.

PRODUCTION: Crude production from the Chauk, Lanywa and Minbu fields in central Burma in 1960 amounted to an estimated 467,000 metric tons (about 9,550 b/d). A certain amount of crude was also produced and locally refined by native operators in the country, chiefly in the Yenangyaung area.

REFINING: The Chauk refinery operated at a rate of about 230,000 metric tons yearly (about 4,600 b/d) while the Syriam refinery throughput was in the region of 240,000 metric tons per year (about 4,800 b/d). The wax processing plant at Chauk was being extended during the year, and at Syriam the company will add a new crude oil distillation unit of 515,000 metric tons yearly capacity to the refinery there.

General Exploration Co. of California has been issued a Certificate of Approval, a prerequisite for an exploration license. Other companies are interested in the country, but some have been deterred by the complicated requirements on exploration license applications.

MARKETING: Products demand continued to increase and late in the year it was necessary to arrange for imports of certain products to meet requirements.

Burma is one of the very few countries in Asia virtually self-sufficient in oil. The Burma Oil Company (1954), Ltd., does not engage in distribution which remains, as before the war, in the hands of Burmah Oil, Indo-Burma Petroleum and Standard Vacuum. Inland consumption of petroleum products has doubled since 1950 and in 1959 was 344,000 tons (6,880 b/d) (plus nearly 26,000 tons for bunkers), an increase of 8% over 1957. More than one-fifth of total demand is accounted for by kerosene.

OIL LAWS

During 1960 the government issued a new set of draft rules for petroleum, which were still being considered at the year's end. The new draft law, as well as the Mineral Concession Rules of 1924 have been analyzed in detail in a highly recommended study of petroleum industry legislation known as *Petroleum Legislation.* This legislative reference service contains a summary and analysis of the oil laws and other oil regulation for every other country of the world, as well. The national sections are prepared by legal counsel recommended by oil companies within the country concerned, and the same oil law firms keep their reviews up to date by loose-leaf revision service. The publisher may be contacted directly at: *Petroleum Legislation Ltd., Post Office Box 1591, Grand Central Station, New York 17, New York.*

NATIONAL FACTORS

A detailed study of taxation of petroleum in Burma has been prepared and will be available during early 1961 under the title of "*International Taxation Series.*" This series covers marketing, refining, transportation, exploration and production taxes, with a separate study of each. For an example of one of these national studies (all are prepared in exactly the same

format) readers are referred to the Colombia section of this issue of World Petroleum Report, that section entitled "Colombia—Petroleum Industry Taxation." Requests for information should be addressed to *"International Taxation Series."* END

CEYLON

There is no exploration or producing reported within the country. Russian and international companies have competed for the market, which runs around 20,000 b/d, of which 50% is fuel oil. Latest development is an eight-year product supply agreement reportedly made with Russia during the last months of 1960. It calls for a supply of Russian oil under a contract signed with a local firm for the sale of 130,000 tons per year, or about 2,600 b/d, of products. A newly organized firm, Ceylon Petroleum Co., said that laid-down cost of Russian products at Colombo will be 25% less than the delivered price of private companies. The company has leased tankage from the government at Trincomalee.

A combine of four major oil companies had offered to establish a refinery, but negotiations seem less favorable since the installation of Ceylon's new government. END

INDONESIA

For the first time in many years, the oil industry of Indonesia is showing signs of renewed life. Until late 1960, the oil companies (Caltex, Shell, and Standard Vacuum) were restricted to their old acreage, which they had pretty much developed to its uppermost limits. With the passage of the oil law in 1960, events took a turn for the better and many companies are looking into the oil prospects of the country.

EXPLORATION: Only one recent oil discovery has been reported. It was by Amoseas, the exploration affiliate of Texaco and Standard Oil Co. of California. The find was at Pematang, 43 miles northwest of the center of the Minas field where Caltex is producing about 150,000 b/d. No details of the discovery have been released. The well was drilled to 6,500 ft. At least two oil zones have been proved. Tests of the interval 4,835-974 ft yielded a peculiar, highly viscous type of crude, composed almost wholly of paraffin and aromatics. The main pay is shallower, at 2,780 ft, where about 35° API gravity high-pour-point crude was tested from Miocene beds. The discovery has yet to be evaluated.

Japanese Agreement: Japanese interests concluded an agreement in 1960 with the government's company, Permina, for exploitation of the old Shell fields in North Sumatra. The Minister for Reconstruction and Development, Chaerul Saleh stated this contract "is a model of the new manner in which foreign investments will be handled by Indonesia," and that there is "no room in Indonesia any more for the old type of foreign investment. Investments in form of credits repayable in the produce to be developed with the international partner are preferred."

PRODUCTION: There are three major producers: Caltex, Royal Dutch/Shell (which originated in this area), and Standard-Vacuum, in that order of importance combined 393,235 b/d were produced in 1960.

REFINING: Total refinery capacity in Indonesia is 273,800 b/d crude charging, with about 10,000 b/d catalytic cracking capacity.

OIL LAWS

By law of 26 October 1960, the government laid down some terms and conditions of oil operations but the law still awaits the regulations to be completed. The law provides that private companies may only have the status of contractor on the basis of "contracts of work" with the government. What these contracts are or will be is not spelled out, and is undoubtedly a matter of negotiation with the government.

Complete text of Indonesia's new oil law has been published in a noteworthy collection: *"Asia and Australasia—Basic Oil Laws and Concession Contracts."* It is a word-for-word compilation of applicable laws, an interesting and useful collection which includes oil regulation for the other countries of Asia and Australasia as well. For information address the publisher directly: *Petroleum Legislation Ltd., P. O. Box 1591, Grand Central Station, New York 17, N. Y.*

NATIONAL FACTORS

A detailed study of taxation of petroleum in Indonesia has been prepared, and will be available early in 1961 under the title *"International Taxation Series."* This series is devoted exclusively to petroleum taxation, covering every type of tax imposed on petroleum operations in all countries. Marketing, refining, transportation, exploration, and production taxes are covered, with a separate study of each. For an example of one of these national studies (all are prepared in exactly the same format), readers are referred to the Colombia section of this issue of *World Petroleum Report,* i.e., the section entitled *"Colombia—Petroleum Industry Taxation."* Requests for information on the entire series should be addressed to *International Taxation Series, P. O. Box 1591, Grand Central Station, New York 17, N. Y.* END

KOREA (SOUTH)

There is no exploration or production. No refineries exist, however the government in 1960 approved construction of a 15,000 b/d refinery to cost $13 million plus $2.5 million in local currency. To be a joint venture of the Korean Petroleum Co. and an undisclosed USA company, the refinery will represent the first major American private investment since passage of a law encouraging foreign investment and a USA-South Korea investment guaranty agreement. Slated for 1964 completion, a survey will determine whether the plant is to be at Mokopo, Masan, Yosu or Ulsen. END

NEW ZEALAND

EXPLORATION: Beginning in 1864, interest was aroused in the petroleum possibilities of the Taranaki and New Plymouth area on the west coast of North Island, and drilling in subsequent years by various local companies resulted in the production of a small but continuing output of crude. Standard-Vacuum instituted an extensive drilling campaign which was terminated in 1944.

Kapuni No. 1 by Shell/BP/Todd Bros., located in the Taranaki basin on the west coast of North Island, was suspended in 1959 at 13,040 ft. Two intervals—12,268-80 ft and 12,366-95 ft—yielded some wet gas when tested, but the shows are considered noncommercial.

Todd Oil Exploration Co. Ltd. has discontinued geological and geophysical surveys in its scattered concessions on both North and South Islands, but applied for a new concession on the northwest tip of South Island.

The third deep well by Shell-BP with Todd Oil Services Ltd. was spudded in late October 1960 on the west coast of North Island at Mangahewa, eight miles south of Waitrara in New Zealand's Taranaki province. The second deep well at Mangaone, on the east coast of North Island, was drilling below 4,000 ft at latest reports.

PRODUCTION: Edgmont Oil Wells Ltd., of New Plymouth, still holds the only current petroleum license in New Zealand, and is the only producer of crude oil. During 1959, the company produced an average 12.3 b/d from four wells.

REFINING: An oil refinery is planned by the Shell group, Caltex, Stanvac, Europa, and Atlantic Union, with 40% New Zealand capital. Initial capacity will be 40,000 b/d, and completion date has been set for 1964.

OIL LAWS

For a detailed and highly recommended study of petroleum-industry legislation and regulation within New Zealand, the editor highly recommends *"Petroleum Legislation."* This is a legislative reference service containing a summary and analysis of the oil laws and other industry regulation for every major country of the world. The national sections are prepared by legal counsel recommended by oil companies who have actually operated within the country concerned. The same oil-law firms keep their reviews up-to-date by loose-leaf revision service. For information on this excellent service, the publisher may be contacted directly at: *Petroleum Legislation Ltd., P. O. Box 1591, Grand Central Station, New York 17, N. Y.*

Among provisions in New Zealand's new budget are (1) an exemption from a company's excess profits tax on behalf of new buildings,

plant, and equipment, plus a special depreciation allowance for plant and machinery; (2) a cut of two cents, bringing the price of gasoline down to 40¢ per gal; (3) a reduction to 33-1/3% from 40% in the sales tax on motor vehicles. END

PAKISTAN

EXPLORATION: Exploration in Pakistan has continued, but with diminishing tempo. Even so, the hunt for oil received a small lift in June-July when a new pool of 41 API gravity oil was discovered below known producing horizons at Dhulian.

Six companies actively continued the search during 1960. They include Pakistan Petroleum Ltd. (Burmah Oil Co.), Standard-Vacuum, Shell Oil, Pakistan Oilfields Ltd. (Attock Oil Co.), Sun Oil, and Tidewater. All six companies have drilled or have participated in drilling during the year.

Karsal 3, after coming on production in October 1959, declined rapidly and was given further acid treatment in July. Production, however, has continued to decline. Karsal 4 was drilled to a depth of 12,222 ft, and has now been plugged back to 11,681 ft. Karsal is operated pointly by Pakistan Petroleum Ltd. and Pakistan Oilfields Ltd.

Natural Gas: Standard-Vacuum, having drilled a third well in its Mari structure, announced reserves in its area at 2.65 billion cubic feet. Pakistan Shell Oil announced the discovery of new natural-gas reserves at Rasidpur, 44 miles south-southwest of Sylhet.

Reserves at Sui are estimated at 5,340 billion cubic feet (equivalent in calorific value to about 120 million tons of fuel oil).

Proposed new pipelines would consist of a new 211-mile 20-in. line from Sui northwards to Multan (the existing 16-in. line would be integrated into the system), and a 125-mile 20-in. extension from Multan to Lyallpur. From Lyallpur, a branch would go 70 miles east to Lahore, the main line going on north via Sargodha 250 miles to Rawalpindi and the new capital nearby, Islamabad, and to Wah. An offshoot from Sargodha would go 100 miles west to Daud Khel. Capacity of the pipe would provide for eventual spurs to run off at various points as markets developed.

PRODUCTION: Crude production continued to rise slowly, and in 1960 averaged 6,914 b/d. Two companies, Pakistan Petroleum Ltd. and Attock Oil Co. (Pakistan Oilfields Ltd.) accounted for the whole of this production. The Dhulian field has produced slightly more than 50% of the total, with Balkassar being the next largest producer.

REFINING: A refinery at Karachi will be constructed by Kellogg International. The 30,000 b/d refinery is expected to be completed within two years. Caltex, Stanvac, Shell, and Burmah Oil will together hold 60% interest. The Pakistani public has subscribed completely the rest of the capital. Work on the refinery site has started, and the plant is expected to be completed by the end of 1962.

TRANSPORTATION: In East Pakistan an 8-in. 22-mile gas pipeline has been completed from Pakistan Petroleum's Sylhet gas field to Fenchuganj. Gas consumption will be about 20 million cubic feet per day. Another smaller 4-in. pipeline, about 11 miles in length, is carrying gas from the Chhatak gas field to the Assam Bengal Cement Co. at Chhatak. When the cement works are on full load, this pipeline will carry 6.5 million cubic feet per day.

MARKETING: There was no basic change in the marketing pattern during 1960. In September, the average price of products was reduced by 7½% in line with similar reductions in India.

OIL LAWS

During 1960, new regulations were promulgated controlling the transmission and distribution of natural gas.

For a detailed and highly recommended study of petroleum-industry legislation and regulation within Pakistan, the editor highly recommends *Petroleum Legislation*. This is a legislative reference service containing a summary and analysis of the oil laws and other industry regulation for every major country of the world. The national sections are prepared by legal counsel recommended by oil companies who have actually operated within the country concerned. The same oil-law firms keep their reviews up-to-date by loose-leaf revision service. For information of this excellent service, the publisher may be contacted directly at: *Petroleum Legislation Ltd., P. O. Box 1591, Grand Central Station, New York 17, N. Y.*

The taxation situation is important in Pakistan, and during 1961 a detailed study of taxation of petroleum in Pakistan will be available under the title of *"International Taxation Series."* This series covers every type of tax imposed on petroleum operations in Pakistan as well as all other countries. Marketing, refining, transportation, exploration, and production taxes are covered, with a separate study of each. For an example of one of these national studies (all are prepared in exactly the same format), readers are referred to the Colombia section of this issue of *World Petroleum Report*, i.e., the section entitled "Colombia—Petroleum Industry Taxation." Requests for information on the entire series should be addressed to *"International Taxation Series," P. O. Box 2744, Grand Central Station, New York 17, N. Y.*

PAKISTAN—Wells Drilled, 1947 to 1960

Year	Oil	Gas	Dry	Total
1947	—	—	1	1
1948	—	—	1	1
1949	—	—	—	—
1950	—	—	1	1
1951	—	1	2	3
1952	—	—	5	5
1953	—	2	—	2
1954	—	—	—	—
1955	1	1	—	2
1956	—	2	7	9
1957	—	—	10	10
1958	—	—	5	5
1959	1	4	8	13
1960	1	2	7	10

NATIONAL FACTORS

The various factors affecting investment in Pakistan have been discussed previously, and have not changed (see *World Petroleum Report 1957*, p. 211, and *World Petroleum Report 1958*, p. 238.) END

TAIWAN

EXPLORATION: Taiwan has long been recognized as a potentially important oil producer, as favorable sedimentary areas exist over almost the whole area. Some small production was obtained during the many years of Japanese control, and when Nationalist China recovered possession in 1945 work was continued with the existing old rigs by a new government-owned concern, the Chinese Petroleum Corp.

1960 Exploration: Petroleum exploration in Taiwan during 1960 was conducted in the western plain and foothills. The success of deepening well R-38 last year in Chinsui field has led to further development in this field. The Chinese Petroleum Corp. has programmed a development project which consists of one 4,500-meter well and three medium-depth wells, ranging from 2,000 to 2,600 meters. One medium depth well which was completed in mid-November 1960 has been producing 2,100,000 cubic ft of gas per day through 11/64" choke from the zone 13 at the flowing pressure of 2,650 psi. Others will be completed in early 1961.

PRODUCTION: There is a very small production on the island. 1960 production was about 39 b/d. Crude oil production in 1959 averaged 36 b/d, compared with 41 b/d in 1958. The oil came from 34 wells, of which seven were flowing and 27 pumping.

Natural gas production averaged 2,525,000 cubic feet per day in 1959, compared with 2,689,000 in 1958.

REFINING: There is one plant, a 28,000 b/d refinery with about 10,000 b/d catalytic cracking capacity, at Kaoshiung. It is owned by Chinese Petroleum Corp., a government company that is fully integrated and markets throughout the island.

TAIWAN—Petroleum Exploration in 1960

Drilling	Total	Well Completed Oil	Gas	Dry	Wells Drilling	Total Footage (Estimated)
Wildcat	5	—	2	2	1	33,000
Development	1	—	1	—	—	4,900
Deeper Pool Test	3	—	—	—	3	25,100
Total	9	—	3	2	4	63,000

Geological & Geophysical Survey	Crew-Month	Shot holes or points	Cumulative profile Estimated, km	Cumulative area Surveyed sq km
Seismic Survey	13	2,600	900	—
Gravity Survey	7	4,000	—	700
Geological Survey	8	—	—	350

OIL LAWS

Entire text of Taiwan's oil legislation has been published in a noteworthy collection, *"Asia and Australasia—Basic Oil Laws and Concession Contracts."* It is a word-for-word compilation of applicable laws, an interesting and useful collection which includes oil regulation for the other countries of Asia and Australasia as well. For information address inquiries directly to its publisher, *Petroleum Legislation Ltd., Post Office Box 1591, Grand Central Station, New York 17, New York.*

NATIONAL FACTORS

The government passed a new investment law on 31 August 1960. The new legislation will remain in force until Dec. 31, 1970, and covers investments in manufacturing, mining and other. Some of the inducements are: (1) A five-year income tax exemption for new companies; (2) Remittance of profits in full; (3) A maximum business income of 18%, nearly half of the former 32.5% rate; (4) Tax exemption on re-invested profits up to 25% of total income; (5) A 2% deduction on earnings derived from exporting; (6) Permission for investors to take 15% of their capital out of Taiwan each year after two years. END

PAPUA

There is no production or refining. For nearly 40 years, drilling has been undertaken by the Australasian Petroleum Co., a joint subsidiary of British Petroleum, Standard-Vacuum, and Oil Search Ltd. Results have been generally disappointing despite the efforts made and large capital sums invested. Gas and oil have been encountered at several locations, but not on a commercial scale.

Standard-Vacuum decided in 1960 to withdraw from its latest Papuan wildcat at Iehi, after having spent more than $70 million without success in Australian New Guinea. However, the Iehi well was drilled by British Petroleum and Oil Search Ltd. (Stanvac's associates), each putting up $1.8 million. Stanvac did not put up any money. During January 1961, it was announced that British Petroleum would also withdraw its financial support. Oil Search Ltd announced it would continue, however. It was committed to spend about $7.2 million over the coming five years, and assumed all liabilities of Australasian and Island Exploration (another exploring subsidiary in the area). British Petroleum and Vacuum Oil (Stanvac) became free of all liabilities, and will hold 20% between them. Oil Search's participation now rises to 80%, with the former partners on option to continue if they should desire to do so in the future. END

THAILAND (Siam)

Exploration activity in Thailand has been minimal in the past, and this trend continued during 1960. The only known oil reserves in the country are located at Farng in the Northwest; these are under the control of a government entity, the Oil Fuel Organization (OFO). Knowledge of OFO exploratory activities is sketchy, but production at Farng is in the neighborhood of 200 b/d and declining.

During 1960, several companies filed applications with the Investment Board to undertake exploratory activities in Thailand. According to press reports, these include Shell, Pan American, Northeastern Oil Co., Tidewater, (Conorado Petroleum Corp., Tharn Namman (a Thai company), and Standard-Vacuum. Two other Thai companies, Thai Shale and Thai Gypsum, have already received exploratory concessions, but have undertaken only limited field work. No action has been taken by the government on these applications pending completion of petroleum legislation now being drafted.

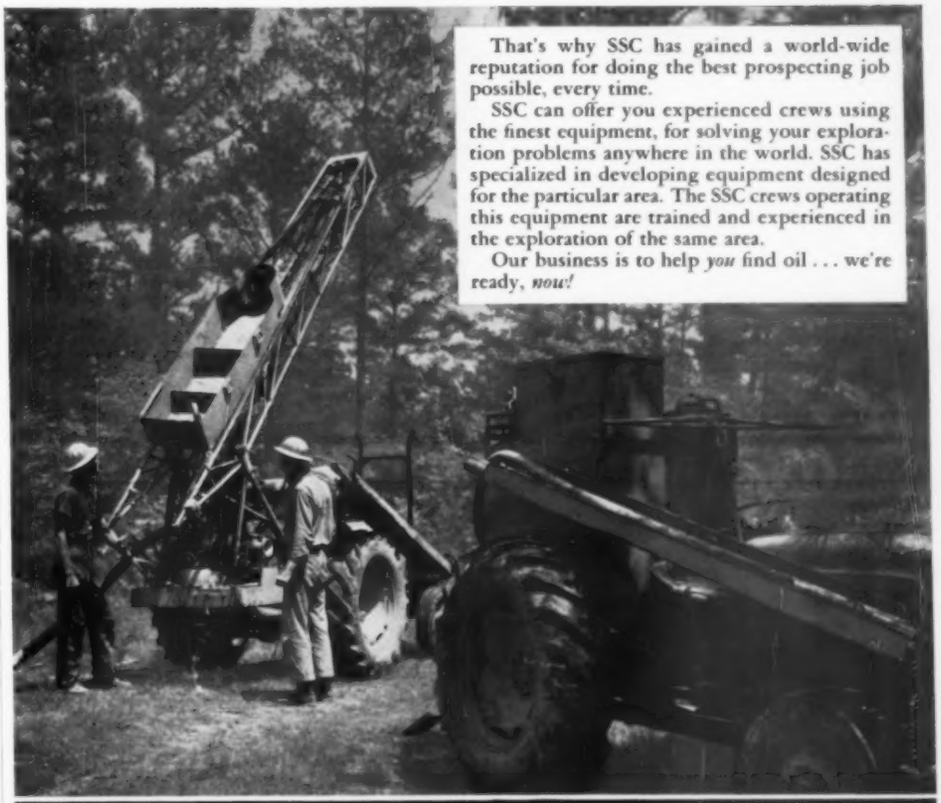
No exploration in the Muang Fang area was carried out in 1960.

Nothing is being done in the exploration field pending resolution of the refinery issue. During 1960, the government invited formal bids, to be submitted by December 3, for the building of a 28,000 b/d refinery under terms similar to those which had been proposed by Indiana Standard —which terms the latter recently had withdrawn. Indiana Standard said a detailed cost analysis indicated the project was not economically attractive.

After considering a variety of refinery projects

OUR BUSINESS IS TO HELP YOU FIND OIL...

The surest least expensive way possible!



That's why SSC has gained a world-wide reputation for doing the best prospecting job possible, every time.

SSC can offer you experienced crews using the finest equipment, for solving your exploration problems anywhere in the world. SSC has specialized in developing equipment designed for the particular area. The SSC crews operating this equipment are trained and experienced in the exploration of the same area.

Our business is to help *you* find oil ... we're ready, *now!*

Seismograph Service Corporation

P. O. Box 1590 • TULSA, OKLAHOMA • NAtional 7-3230

WORLD-WIDE SUBSIDIARIES

for years, the Thai government finally decided to build a relatively small 5,000 b/d plant near Bangkok; nevertheless, it has not abandoned the 28,000 b/d refinery project. END

TIMOR

There is no production or refining. An exploration program was resumed by an American company and its Australian partner.

Two dry holes were drilled on the island in 1959 by Tradewinds Exploration Inc., of Denver, Colo., and Timor Oil Ltd., an Australian firm. The two companies hold a concession on 7,000 square miles in Portuguese Timor, which is the eastern half of the island.

A wildcat will be drilled near an oil seep which produced an average of 12 b/d of crude under a government-supervised 90-day test. The site is near the south coast of the island at the village of Matai. The well will be drilled to the Mota Bui limestone (Triassic) at about 5,000 ft. It will drill through Tertiary sands to reach its projected depth.

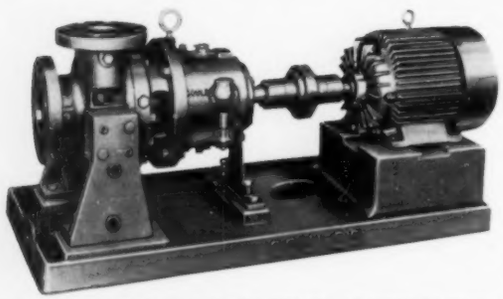
OIL LAWS

Text of oil legislation in Timor has been published in a noteworthy collection: "*Asia and Australasia—Basic Oil Laws and Concession Contracts.*" It is a word-for-word compilation of applicable laws, an interesting and useful collection which includes oil regulation for the other countries of Asia and Australasia as well. For information address the publisher directly: *Petroleum Legislation Ltd., P. O. Box 1591, Grand Central Station, New York 17, N. Y. Central Station, New York 17, N. Y.* END

GOULDS STEEL CASE CENTRIFUGAL PUMPS

for the petroleum refining industry

Dependable, trouble-free performance is essential in refinery and gasoline plant service. Goulds reputation for reliability is world-wide. More than 1,200 standard pump models and combinations are made by Goulds, world's largest manufacturer of pumps exclusively. Each is delivered with 114 years of engineering experience behind it. Each performs with unerring reliability.



PROCESS PUMPS
FIGURE 3775

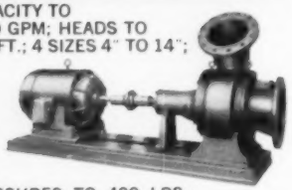
For reflux, feed, kettle product, overhead product, hot condensate and many other services in refineries and gasoline plants. Fig. 3775 is a horizontal centerline mount, vertically split case, enclosed impeller pump designed specially for the exacting requirements of the petroleum and petrochemical industries, conforming to API-610 specifications. 300 lb. raised face flanges are standard. Pumps are rated for maximum operating temperatures up to 600°F. and working pressures up to 550 PSI. High degree of parts interchangeability covers full range of sizes.

CAPACITY TO 850 GPM; HEADS TO 350 FT.; 11 SIZES 1" TO 4"; TEMPERATURES TO 600°F.; BULLETIN 724.1.

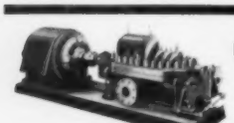
HEAVY DUTY SLURRY PUMPS
FIGURES 3138 AND 3139

For spent catalyst service, handling coke fines or other types of slurry applications. Specially designed for heavy duty pumping of corrosive or non-corrosive liquids, with or without solids in suspension. Vertically split casing and "back pull-out" design permit pump to be dismantled without disturbing piping, pump case, or driver. Self-venting discharge at highest point in casing eliminates air binding, insures steady flow. Clearance between impeller and side plates externally adjustable. Renewable sideplates. Split, cowl-type gland suitable for quenching.

CAPACITY TO 9000 GPM; HEADS TO 160 FT.; 4 SIZES 4" TO 14";



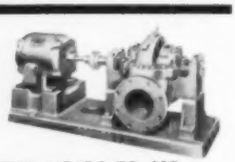
PRESSURES TO 400 LBS.; TEMPERATURES TO 350°F.; BULLETIN 723.4.



MULTI-STAGE HORIZONTALLY SPLIT CASE CENTRIFUGAL PUMPS
FIGURE 3360-3365

CAPACITY TO 2250 GPM; HEADS TO 3200 FT.; 4 SIZES 3", 4", 6" AND 8"—4, 6 AND 8 STAGES; TEMPERATURES TO 350°F.; BULLETIN 722.4.

DOUBLE SUCTION HORIZONTALLY SPLIT CASE CENTRIFUGAL PUMPS
FIGURE 3405



CAPACITY TO 6400 GPM; HEADS TO 425 FT.; 33 SIZES 3" TO 12"; TEMPERATURES TO 350°F.; BULLETIN 721.6.

For complete information on Goulds Pumps for Petroleum Refining write to:

GOULDS PUMPS 260 MADISON AVENUE — **INTERNATIONAL** NEW YORK 16, NEW YORK

INDIA

EXPLORATION: The government invited bids on oil exploration areas, but as of the end of 1960 no agreements had been reached.

Standard-Vaccum notified the government in 1960 that it wants to withdraw from a 10,000-square-mile concession in eastern India, where it has drilled 10 dry holes in the past six years. Stanvac has 75% interest in the project, and the government 25%. Stanvac has an application pending on another 10,000-square-mile-concession on the opposite side of the subcontinent, in the Rajasthan region. This is north of the Cambay area. Stanvac this time is seeking a concession in which it will have 100% ownership.

Oil and Natural Gas Commission Activities —1960: The commission's exploration activities continued on an extensive scale during 1960; they are outlined in accompanying tables.

PRODUCTION: Nahorkatiya and Moran oil fields in Upper Assam will open shortly with an initial capacity of about 30,000 b/d. Oil India Private Ltd. estimates this level (about 1.66 million tons per year) will be available from existing wells when a 260-mile 16-in. crude pipeline to a new refinery at Gauhati opens late in 1961. Earlier estimates placed the capacity of the two fields at 2.75 million tons per year, or better than 50,000 b/d.

The Indian government places Cambay crude reserves at 20 million tons (about 140,000,000 bbl).

TRANSPORTATION: Crude Pipeline Construction: Oil India Private Ltd., which will produce crude oil from its wells at Nahorkatiya and Moran and transport it to government Nunmati (Gauhati) and Barauni refineries, has appointed The Burmah Oil Co. (Pipe Lines) Ltd. as constructors for the project. Oil India Private Ltd. is a partnership owned 66⅔% by The Burmah Oil Co. Ltd. (of which Assam Oil Co. is a subsidiary), and 33⅓% by the government.

The government is considering construction of a series of products pipelines within five years.

REFINING: Total refinery capacity in India at the end of 1960 was 116,200 b/d in five plants.

The government planned a 10,000 b/d to

INDIA—Estimated Petroleum Refinery Capacity December 31, 1962

Name of Refinery	Location	Capacity (Barrels Per Stream Day)	%
Burmah Shell	Trombay	52,000	29.7
Standard Vacuum	Trombay	41,000	23.4
Caltex	Visag	17,000	9.9
Assam Oil	Digboi	10,000	5.7
Gauhati (GOI)	Gauhati	15,000	8.5
Barauni (GOI)	Barauni	40,000	22.8
	Total:	175,000	100.0
	Total:	8,750,000	Long tons per year

INDIA—Government Drilling

(At present 10 deep drilling rigs are in use)

Location and Well No.	Spudded on	Completed on	Depth on 10-31-60 (Meters)	Total Meters During 1960 (Up to Oct. 1960)	Remarks (As of 10-31-60)
PUNJAB					
1. Jawalamukhi Well No. 2	5.8.60	—	796	796	Drilling continued
2. Hoshiarpur Well No. 2	10.10.60	—	801	801	Drilling continued
CAMBAY					
3. Cambay Well No. 3	28.11.59	19.1.60	2,077	577	Oil struck
4. -do- -4	20.12.59	29.1.60	2,103	1,299	Oil struck
5. -do- -5	8.2.60	15.3.60	1,878	1,878	Oil struck
6. -do- -6	8.3.60	29.4.60	2,166	2,166	On further test
7. -do- -7	18.5.60	27.7.60	2,239	2,239	Oil struck
8. -do- -8	13.4.60	10.6.60	2,248	2,248	Oil struck
9. -do- -9	13.8.60	—	1,809	1,809	Oil struck under test
10. -do- -11	17.9.60	—	1,564	1,564	Drilling continued
11. -do- -14	24.9.60	—	1,721	1,721	Drilling continued
12. -do- -15	16.8.60	—	1,756	1,756	Drilling continued
ANKLESHWAR					
13. Ankleshwar-1	26.2.60	25.4.60	1,967	1,967	Oil struck
14. -do- -2	5.7.60	14.9.60	1,450	1,450	On production test
15. -do- -3	5.9.60	—	1,212	1,212	Drilling continued
16. -do- -4	1.8.60	—	1,526	1,526	Drilling continued
17. -do- -6	23.10.60	—	562	562	Drilling continued
ASSAM					
18. Sibsagar Well No. 2	29.5.60	23.9.60	3,817	3,817	On test
Total:			31,692	29,388	

20,000 b/d refinery in the Cambay area. K. D. Malaviya, Minister for Mines and Fuel, said early in the year that planning for the project was to start at the end of 1960, when a better appraisal of the field's potential would be possible.

The government also decided to build a 20,000 b/d refinery at Madras, in southeastern India, to operate on imported crude.

MARKETING: According to government estimates, India's annual oil requirements will be 14 million tons by 1965 and between 30 and 40 million tons by 1975, as compared with seven million tons in 1959.

OIL LAWS

For a detailed and highly recommended study of petroleum-industry legislation and regulation within India, the editor highly recommends *"Petroleum Legislation."* This is a legislative reference service containing a summary and analysis of the oil laws and other industry regulation for every major country of the world. The national sections are prepared by legal counsel who have been recommended by oil companies. The same law firms keep their reviews up-to-date by loose-leaf revision service. For information on this excellent service, the publisher may be contacted directly at: *Petroleum Legislation Ltd., P.O. Box 1591, Grand Central Station, New York 17, N.Y.* END

JAPAN

Japan has the fastest rate of industrial growth in the world, and her oil demand is estimated to rise at the rate of 14% annually througout the coming decade. While some small oil production exists and modest exploration finds have been made, Japan's oil needs will continue to be mostly imported.

EXPLORATION: Japan has operated a number of small fields located near the western coasts of its principal islands for many years. Production from these is at the rate of only about 7,000 b/d, which is less than 4% of the country's domestic needs which explains Japan's anxiety to secure overseas production, particularly in the Middle East and Indonesia. Depths of production in the existing fields are shallow, the deepest having been about 5,500 ft. in the Yabase field on the island of Honshu. Geological and geophysical studies by American technicians during the allied occupation located structures considered favorable at greater depths, possibly 12,000 ft. An offshore survey located other likely structures.

Reserves: Proved recoverable reserves of oil as of 31 October 1960 are estimated by the principal operating company in Japan at 50,400,000 barrels.

Partly through lack of hope for large domestic production, the Japanese have extended their efforts to other countries. For a review of their efforts in Indonesia please refer to that country section in this review. For a review of their efforts in the Neutral Zone, please refer also to that section in the review.

Preferential Treatment for Arabian Crude: The Japanese group which discovered an offshore oil field in the Neutral Zone of the Middle East are backed by government loans and the government is expected to take measures to encourage its importation into Japan. The producing governments of Saudi Arabia and Kuwait (see Neutral Zone section) will probably oppose any discount, so the management of the Japanese company has asked the Japanese Government to declare the oil produced in the Persian Gulf as "yen oil." Under such a ruling, the oil could come into Japan without the necessity of obtaining import licenses, which would mean that it would enter the country on an unrestricted basis. This would give the Persian Gulf oil of the Japanese company a preferential treatment in the Japanese market, since other importers would have to be allocated foreign exchange by the Japanese government. This is being resisted by the British and American companies on the ground that it would be discriminatory because Japan would be restricting oil imports from foreign suppliers by not allocating exchange.

PRODUCTION: Crude production in Japan has not changed greatly during the past 50 years. Demand expansion is so great that little change in the ratio of supply to demand can be expected. Crude oil is produced mostly in Akita, Niigata and Yamagata prefectures. Production from other areas is negligible.

In 1930 domestic crude, at about 2 million bbl, supplied over 14% of total demand, some 14 million bbl. However, demand rose so rapidly that by 1959, domestic crude—at 2.9 million bbl—supplied less than 2% of the total demand, 147 million bbl.

Production averaged 7,825 b/d in 1959. In 1960 it averaged about 7,900 b/d.

REFINING: The number of operating refineries and their capacities has grown rapidly. It was 19,200 b/d at the end of 1945, but at the end of 1960 it had risen to 640,000 b/d.

Nippon Oil has asked permission to build a 150,000 b/d to 200,000 b/d refinery at Nishinomiya, plus a petrochemical plant and new harbor facilities at the site. Nippon is a partner of Caltex in other refineries, but Caltex is not involved in the new proposal.

Idemitsu Kosan plans to build two new refineries within the "next few years" in the Tokyo and Osaka or Nagoya areas. The firm now owns a 100,000 b/d refinery at Toyama.

JAPAN: New Forecast Of Energy Supply In 1970

(Million metric tons coal equivalent) (a)

	Fiscal Year 1959	1970
Coal and lignite production and imports	51.3	81.5
Crude oil production	0.7	2.1
Imports of crude	35.7	128.7
Imports of products	2.9	9.8
Total oil as actual Kl. of oil (in millions)	**27.5**	**98.3**
Natural gas	0.8	2.3
Hydro-power	37.0	55.1
Wood and charcoal	5.3	3.7
TOTAL ENERGY	133.7	283.2
Oil as per cent of total energy	29½	49½

(a) 7,000 Kcal per kgm.

Source: Japanese Economic Deliberative Council.

MARKETING: Petroleum demand in Japan has risen from 1.6 million barrels in 1945 to over 160 million barrels in 1960. The rise in demand is concentrated in Tokyo, Osaka and Nagoya and their surrounding areas, which accounted for more than 60% of all Japanese demand.

Demand in Japan has been chiefly supplied by imports.

NATIONAL FACTORS

A detailed study of taxation of petroleum in Japan has been prepared and will be available during early 1961 under the title of *"International Taxation Series."* This series is devoted exclusively to petroleum taxation, covering every type of tax imposed on petroleum operations in all countries. Marketing, refining, transportation, exploration and production taxes are covered, with a separate study of each. For an example of one of these national studies (all are prepared in exactly the same format) readers are referred to the Colombia section of this issue of *World Petroleum Report*, that section entitled "Colombia—Petroleum Industry Taxation." Requests for information on the entire series should be addressed to *"International Taxation Series," Post Office Box 1591, Grand Central Station, New York 17, New York.* END

PHILIPPINES

EXPLORATION: Exploration for petroleum in the Philippines continued at a higher level during 1960. As in the previous year, surface and subsurface explorations were carried out mostly in the Cagayan valley, the Luzon central valley, and the Cebu-Negros sedimentary basins, which represent three major petroleum regions.

Republic Resources and Development Corp. (**Redoco**): Completion of No. 1-A Reina Regente in Toledo, Cebu, in September 1959 for 72 b/d of oil initiated what appears to be the first commercial production in the Philippines. A twin, the Redeco No. 1-A-X Reina Regente, was perforated opposite a zone different from the Reina Regente 1-A producing zone, and swabbed 125 b/d of oil during a test conducted in January 1960. A development program, started early in 1960, resulted in the drilling of five additional stepout and development wells: No. 1 Villalon, No. 1 Parahinog, No. 2 Villalon, No. 2-A Reina Regente, and No. 3-A Reina Regente. Of these five wells, all but the No. 2-A Reina Regente were abandoned.

Acknowledgment is made of the generous help given by Mr. Benjamin Gozon, Director of Mines, Department of Agriculture, Bureau of Mines; also of the assistance lent by the private companies operating.

Philippine Oil Development Co., Inc. (Podco) has shared with Redeco (with the exception of the Reina Regente Spanish petroleum grant) in the drilling and seismic operations in Toledo and southern Cebu. On March 3, 1960 Podco started the No. 1 San Miguel on Panay Island, and abandoned this well on May 2 at 7,272 ft after having encountered one gas show at 500 ft. On August 6, the Podco No. 7 Bondoc spudded in southern Luzon and was reported below 1,700 ft on October 1, having encountered a gas show at 945 ft. Podco also performed seismic work in central Luzon jointly with San Jose Oil Co.

Acoje Oil Exploration and Drilling Co. continued its drilling program in 1960 in Cebu with No. 1 Malolos, a joint venture with Hixbar Mining Co. Inc. The well was spudded on March 11, and reached a depth of 9,017 ft on August 2. Fifteen gas zones were encountered between 1,254 ft and 6,435 ft in the Middle Miocene.

San Jose Oil Co Inc. (related to Pancoastal Petroleum and Pantepec Oil Co.) continued its systematic exploration work during 1960 by the use of three seismic parties, two in the Luzon central valley and one in Mindanao.

REFINING AND MARKETING: The present Philippine demand for petroleum products is approximately 55,000 b/d, with an indicated 10% annual increase. One refinery is now in operation, and three more are in the construction stage.

The Caltex refinery is located at Bauan, Batangas, 70 miles south of Manila. It was completed in late 1954. The refinery processes 24,000 b/d of crude to produce gasoline, kerosine, and several grades of diesel and fuel oils. Crude is imported from the Minas and Duri fields of Sumatra.

Stanvac now is in the process of building a $45 million refinery at Limay on the Bataan peninsula, approximately 20 miles west of Manila. The refinery is rated at 25,000 b/d, and was scheduled for completion late in 1960.

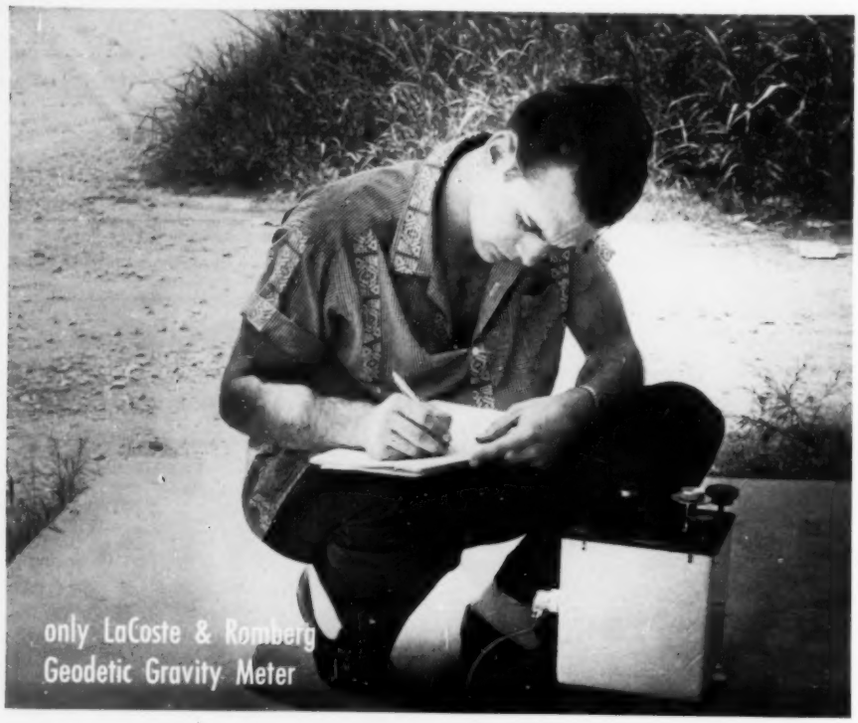
Filoil Refining Co., a local firm in which Gulf Oil Corp. has a 30% interest, has received a refinery concession, and plans to build a plant with a minimum throughput of 10,000 b/d. Present plan calls for the use of Kuwait crude.

Shell Oil Co. plans to build a 25,000 b/d capacity refinery at Tabango, Batangas, 76 miles south of Manila. Filipinos will provide 25% of the estimated $43 million capitalization. Construction will be completed in 1962. Bechtel International is the constructor.

OIL LAWS

Two laws affecting the oil industry were passed by the congress in 1960. One, Republic Act No. 2713, provides for the suspension of the penalty for noncompliance with work obligation expenditures under cetrain conditions. It also provides for a more liberal application of work obligation expenditures under these same conditions.

The other law enacted was Republic Act, No. 2698, which introduced a 27½% depletion allowance as a deduction from gross income (less



gives you **thermal controlled accuracy in a 7-pound meter**

- world survey without resetting
- never requires recalibrating
- less than 0.5 mgl drift per month
- no "sets" or "tares" under normal operation

This new miniaturized Geodetic Gravity Meter retains all the accuracy and dependability of the standard model introduced by LaCoste & Romberg in 1956, yet it weighs only 7 pounds. (Complete with battery and luggage-type carrying case, it weighs less than 17 pounds). With a world-wide range of over 6,000 mgl., this instrument has a repeatability of 0.01 mgl. Actual field tests over the complete gravity range have shown an accuracy better than 0.04 mgl.

Exceptionally high sensitivity of the LaCoste & Romberg meter is attained by a zero length spring suspension (U. S. Patent No. 2,293,437). Calibration is stabilized by means of patented lever systems that act on the main spring rather than on weak measuring springs. And by thermostating, drift is normally reduced to less than 0.5 milligal per month.

Rugged and dependable, the LaCoste & Romberg Geodetic Meter requires practically no maintenance in the field. Its gravity responsive system is completely suspended by springs and will therefore withstand any shock that will not damage the housing supporting it. It is specifically designed to provide a lightweight meter with higher accuracy and lower drift than can be attained in any other geodetic gravity meter. For complete information, write for *Miniature Geodetic Gravity Meter Bulletin*.

LaCoste & Romberg | 6606 NORTH LAMAR | AUSTIN, TEXAS

rents and royalties paid) from oil and gas walls with certain qualifications.

Both these laws, along with the entire text of Philippine oil legislation, have been published in a noteworthy collection: *"Asia and Australasia—Basic Oil Laws and Concession Contracts."* It is a word-for word compilation of applicable laws, which includes oil regulation for the other countries of Asia and Australasia as well. For information, inquiries should be addressed directly to the publisher, *Petroleum Legislation Ltd., P. O. Box 1591, Grand Central Station, New York 17, N. Y.*

A detailed study of taxation of petroleum in the Philippines has been prepared, and will be available early in 1961 under the title *"International Taxation Series."* This series is devoted exclusively to petroleum taxation, and covers all taxes imposed on petroleum operations in all other countries as well. Marketing, refining, transportation, exploration, and production taxes are covered—with a separate study of each. For an example of one of these national studies (all are prepared in exactly the same format), readers are referred to the Colombia section of this issue of *World Petroleum Report,* i.e., the section entitled *"Colombia—Petroleum Industry Taxation."* Requests for information on the entire series should be addressed to *"International Taxation Series," P. O. Box 1591, Grand Central Station, New York 17, N. Y.* END

VIETNAM

There is no exploration, production, or refining. Three marketers in South Vietnam—Stanvac, Shell, and Caltex—are considering a refinery project in the country in the face of possible entry by a rival group. Sterling Oil—reportedly backed by Summit Corp., Phillips Petroleum, and American Independent Oil—is planning to enter the local market, and may offer to build processing facilities.

Cie. Francaise de Pétroles is also reported making an offer to build a refinery in Vietnam, where a joint Standard Vacuum-Shell project is already under active consideration. END

MALAYA

There is no exploration, production, or refining. Marketing needs are small, about 4,700 b/d, plus about 14,700 b/d bunker demand.

Three refineries are planned on the Malayan peninsula. At present there are no plants at all. Shell wants to build a $13 million refinery at Singapore and a $20 million plant somewhere in the Federation of Malaya. The plants would be designed to fill existing and future demand for the company's products in each area. Singapore and the Federation are separate from each other politically, and official application for a pioneer status of the projects has been made with each government.

Standard-Vacuum has asked the Federation of Malaya for permission to build both a refinery and a fertilizer plant at a total investment of $32 million.

Maruzen and Koyo Manka Kaisha (both Japanese companies) have a 20,000 b/d refinery scheduled in Singapore.

NATIONAL FACTORS

It is less than three years since the Federation of Malaya achieved independence within the British Commonwealth. She has already established a creditable record of political stability and economic achievement. Much has been done to create a climate favorable to private investment in industry. Tax concessions are being granted to new industries, both foreign and domestic, and the Federation has concluded an investment-guaranty agreement with the United States, which makes possible insurance against expropriation and convertibility risks. It is expected an agreement for the avoidance of double taxation also will be signed. END

Are you selling to the world's oil industry?

New and revised, the 36th edition of the world's oldest and most complete oil directory

THE INTERNATIONAL PETROLEUM REGISTER

- It has been completely redesigned to place at your fingertips the most up-to-date information on every oil producing company in the world.
- Every one of your district sales offices and your distributors should have a working copy of the 36th Edition of The International Petroleum Register. The price is only $25.00 for this 500-odd-page book of over 33,000 names, and companies, with operating personnel and complete company information available on approval at any time with no obligation.

INTERNATIONAL PETROLEUM REGISTER

25 West 45th Street **New York 36, N. Y., U.S.A.**

ADVERTISERS' INDEX

(Advertising Agencies in Italics)

Albach & Company 126

ARBED Electric Steel Works Company 145

Baker Oil Tools, Inc. 6-7
John A. Ripley Advertising, Inc.

BASF (Badische Anilin & Soda Fabrik AG) 91

Beckman Instruments, Inc. 39
Charles Bowes Advertising, Inc.

Automobiles M. Berliet 140-141

Gottfried Bischoff KG 78
M. P. Kleinmann KG

BMA (Braunschweigische Machinenbauanstalt) 51

Borg Warner Corporation Cover II
Clinton E. Frank, Inc.

Bopp & Reuther, GMBH 82

Borsig, AG 113

Bowen Itco, Inc. 59
A. S. Black & Company, Inc.

British Oxygen Company Ltd. 23
F. C. Pritchard Wood & Partners Ltd.

Brown & Root, Inc. 191
D'Arcy Advertising Company

Byron Jackson Tools, Inc., (a subsidiary of Borg-Warner Corp.) Cover III
John Ramsey Company

California Texas Oil Company 147
Gaynor & Ducas, Inc.

Cameron Iron Works, Inc. 266
Boone & Cummings

Cape Insulation & Asbestos Products Ltd. 224-225
Taylor Advertising, Ltd.

Carrier International, Ltd. 10-11
N. W. Ayer & Son, Inc.

Celler Maschinenfabrik Gebrüder Schäfer 100

C.I.P.I. S.p.A. (Costruzioni Impianti Petroliferi Industriali) 153

Clark Bros. Co., One of the Dresser Industries 43, 47
Persons Advertising, Inc.

Continental-Emsco Co., Div. of Youngstown Sheet & Tube Co. 13
Rogers & Smith Advertising Agents, Inc.

Core Laboratories, Inc. 56
Duvall Williams Advertising

Crane Company 207
National Export Advertising Service

Daimler-Benz AG 104-105

Degussa Hanau 110

C. Deilmann Bergbau GMBH 99
Gesellschaft Für Industrie-Beratung, MBH

Demag AG 106-107
Walter Rau Werbeagentur

Deutsche Schachtbau und Tiefbohrgesellschaft 111

Didier-Werke AG 121
Friedrich W. Heye Werbeagentur AG

G. Dikkers & Company N.V. 139

Dresser Industries, Inc. 41
Persons Advertising, Inc.

E. I. du Pont de Nemours & Company 164-165
The Rumrill Company Inc.

Dynamit Nobel AG 90

Ellenberger & Poensgen GMBH 132

Engelhard Industries, Inc. 25
Stuart Sande Advertising

English Electric Company Ltd. 175
The Technical Advertising Service Ltd.

Ethyl Corporation 171
Reach, McClinton & Compnay, Inc.

Foster Wheeler Corporation 28-29
Arndt-Preston-Chapin-Lamb & Keen, Inc.

Comptoir Franco Belge Des Tubes (FBT) 65

Franklin Supply Company 249
McCormick & Henderson, Inc.

Gardner-Denver Company 169
Buchen Advertising

Gaso Pump & Burner Manufacturing Company 4
Bachrodt, Newell, O'Kane & Gano, Inc.

General American Transportation Corporation 5
Edward H. Weiss & Company

General Geophysical Company 12
Rives, Dyke & Company

General Motors Overseas Operations 252
Robert Otto & Company, Inc.

The Geolograph Company 191
Lowe Runkle Company

Geophysical Service Inc. 229
Auld Advertising

GFA (Gesellschaft für Automation, MBH) 84-85

G-S-T (Gesellschaft für Selbsttatige Temperaturregelung) 130-131

Goulds Pumps International Inc. 284
Adpower, Inc.

Gräbener, Theodor 109

Grunzweig & Hartmann AG 119
Planet Werbedienst

The Guiberson Corp., One of Dresser Industries 9
Ted Workman Advertising, Inc.

Haniel & Lueg GMBH 129

Herb J. Hawthorne Inc. 213
Robinson-Gerrard-McGary, Inc.

Hercules Tool Company 250
Keefe Advertising Agency

Hillman-Kelley 167
Darwin H. Clark Company

Hoesch AG 96-97

Hughes Tool Company 133-134
Foote, Cone & Belding

Chemische Werke Hüls AG 98

Hydril Company 211
Don Jenner Advertising Agency

Hydrocarbon Mineralöl G.M.B.H. 101

Ideco (Division of Dresser Industries) 136-137
Don L. Baxter, Inc.

International General Electric Company 62-63
Grant Advertising, Inc.

Italcementi Fabriche Riunite Cemento 160-161

Jensen Engineering Company 241
Keefe Advertising Agency

Johnston Testers, Inc. 1
Rives, Dyke & Company

Kali-Chemie AG 49

The M. W. Kellogg Company 14
Fuller & Smith & Ross, Inc.

Ernst Kirchner 108

Klockner-Humboldt-Deutz AG 103

Friedrich Kocks GMBH 118

Koenig Iron Works, Inc. 191
Bozell & Jacobs, Inc.

Koppers, Heinrich GMBH 92-93

Krupp, Fried. 127

LaCoste & Romberg 286
Marvin Gwinn & Associates, Inc.

Gesellschaft Für Linde's Eismaschinen AG 120

Lufthansa German Airlines International 112, 269
Charles W. Hoyt Company, Inc.

Lummus Company 16
G. M. Basford Company

Magnet Cove Barium Corporation 195
Trozell & Associates, Advertising

J. F. Mahler Apparate-Und Ofenbau K.G. 123

M.A.N. (Maschinenfabrik Augsburg-Nurnberg AG) 79
Linder Presse Union GMBH

Mannesmann Export AG 74-75
Hassenpflug & Lindstrom GMBH

Mannesmann-Meer AG 72
Hassenpflug & Lindstrom GMBH

Mannesmann-Rohrleitungsbau GMBH 73
Hassenpflug & Lindstrom GMBH

Martin-Decker Corporation 57
Dozier Eastman & Company

Mid-Continent Supply Company 199
Magnussen Advertising Agency

Milwhite Mud Sales Company 215
Boone & Cummings, Advertising

Mission Manufacturing Company 218
Rives, Dyke & Company

Lee C. Moore Corporation 8
Paul Locke Advertising Inc.

Motherwell Bridge Contracting And Trading Company, Ltd. 226

MWM (Motoren-Werke Mannheim AG) 128

Namco International, Inc. 201
The McCarty Company of Texas, Inc.

Newalls Insulation Company Ltd. 251
Doig Advertising Ltd.

Newman Hender & Company Ltd. 237
Adams Bros. & Shardlow Ltd.

Novacel Blanose C.M.C. 52

Oil Center Tool Company Cover IV
Rives, Dykes & Company

Oil Metering and Processing Equipment Corporation 18

Outboard Marine International S.A. 159
Erwin Wasey, Ruthrauff & Ryan, Inc.

Pacific Pumps, Inc. (A Division of Dresser Industries, Inc.) 45
Persons Advertising, Inc.

Pan Geo Atlas Corporation 15
Brinley Advertising Agency

Ralph M. Parsons Company 21
Dozier Eastman & Company

Peters, Claudius AG 122

Petrolite Corporation 34
Batz-Hodgson-Neuwoehner, Inc.

Phoenix-Rheinrohr International GMBH 124-125
Ruhr-Studio

Pipe Line Technologists, Inc. 66
Ullrich & Brown, Advertising

Pittsburgh-Des Moines Steel Company 150
Sam J. Gallay, Advertising

Porta-Kamp Manufacturing Company, Inc. 203
Trozell & Associates, Advertising

Procon, Inc. 148-149
Tobias, O'Neil & Gallay, Inc.

Robert H. Ray Geophysical Companies 189
Rives, Dyke & Company

Rector Well Equipment Company, Inc. 253
Fuller & Smith & Ross Inc.

Reed Roller Bit Company 232
Rives, Dyke & Company

Rekuperator KG 68

N.V. Rijnstaal v.h. J. W. Oonk & Company 142

Rogers Geophysical Companies 204
Rives, Dyke & Company

CHS (Sahara Housing & Hotels Company) 56

Salzgitter Stahlbau GMBH 116

Salzgitter Maschinen AG. 114-115

Santa Fe Drilling Company 209
Dozier Eastman & Company

Guido Sartori S.p.A. 152

Schlumberger Overseas 36
Rives, Dyke & Company

Wilhelm Schmidding 117

Security Engineering Division (One of the Dresser Industries) 35
Don L. Baxter, Inc.

Franz Seiffert & Company AG 71
Hassenpflug & Lindstrom GMBH

Seismograph Service Corporation 283
Watts, Payne Advertising, Inc.

Serveo 163
Clyde D. Graham, Advertising

Shaffer Tool Works 31
Dozier Eastman & Company

S.H.R.M. Catering & Food Supply Company 197

Siemens-Schuckertwerke AG 88-89

SNAM (E.N.I. Group Companies) 155

Southwestern Industrial Electronics (One of the Dresser Industries) 2-3
Weekley & Valenti Advertising

Stahl-Armaturen Siepmann GMBH 77
Otto Ernst Wulfing

Stewart & Stevenson Services Inc. 186
Rives, Dyke & Company

Stewarts & Lloyds Ltd. 179
H. Raymond Morgan

Carl Still, Recklinghausen 80-81

J. Stone & Company (Propellers) Ltd. 271

Sulzer Brothers Limited 172

Technip 64

Technitub Italiana, S.p.A. 157

Willy Thiele 95

N.V. Motorenfabriek Thomassen 143

Friedrich Uhde GMBH 83

United States Steel Corporation (Oil Well Supply) 181
Batten, Barton, Durstine & Osborn Inc.

Universal Oil Products Company 176-177
Tobias, O'Neil & Gallay, Inc.

Wasag-Chemie AG. 193

Western Geophysical Company 217
L. J. Swain Advertising, Inc.

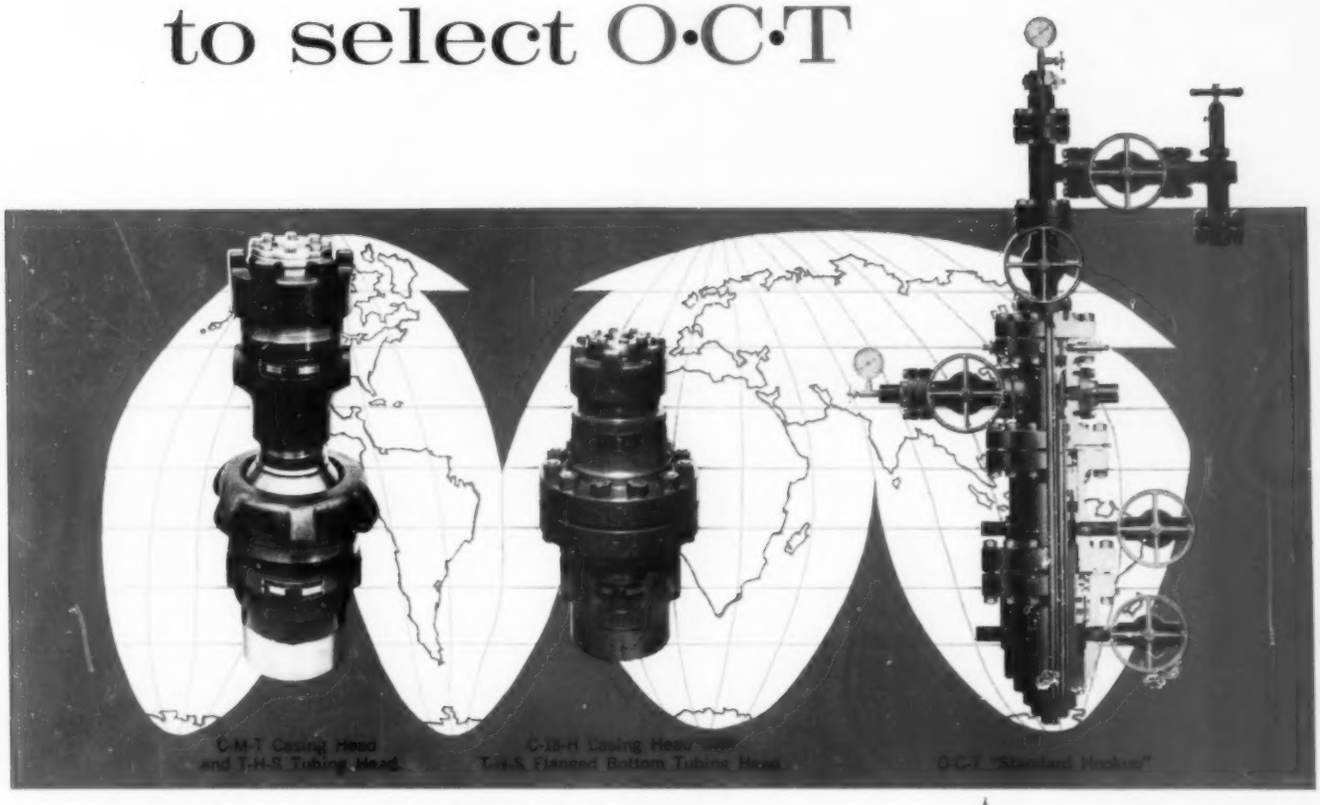
Williams Brothers 223
Ferguson-Miller Associates

W-K-M Division of ACF Industries, Inc. 235
McCann-Erickson, Inc.

Worthington Corporation 273
Gotham-Vladimir Advertising, Inc.

Louis Zhendre 61

The reason to select O·C·T



SIMPLICITY WITH SAFETY ANYWHERE YOU DRILL

Different areas of the world offer different completion problems, but Oil Center Tool Company offers the most complete line of equipment for your well . . . whether it is shallow, deep, high pressure, low pressure, single, dual or multiple completion.

This means you can standardize on O-C-T . . . the **standard** throughout the oilfields of the world for dependability and simplicity with safety.

O-C-T equipment is available from the United States, France and England. Please write for new booklets now available on low pressure equipment and the standard lines of O-C-T medium and high pressure equipment.

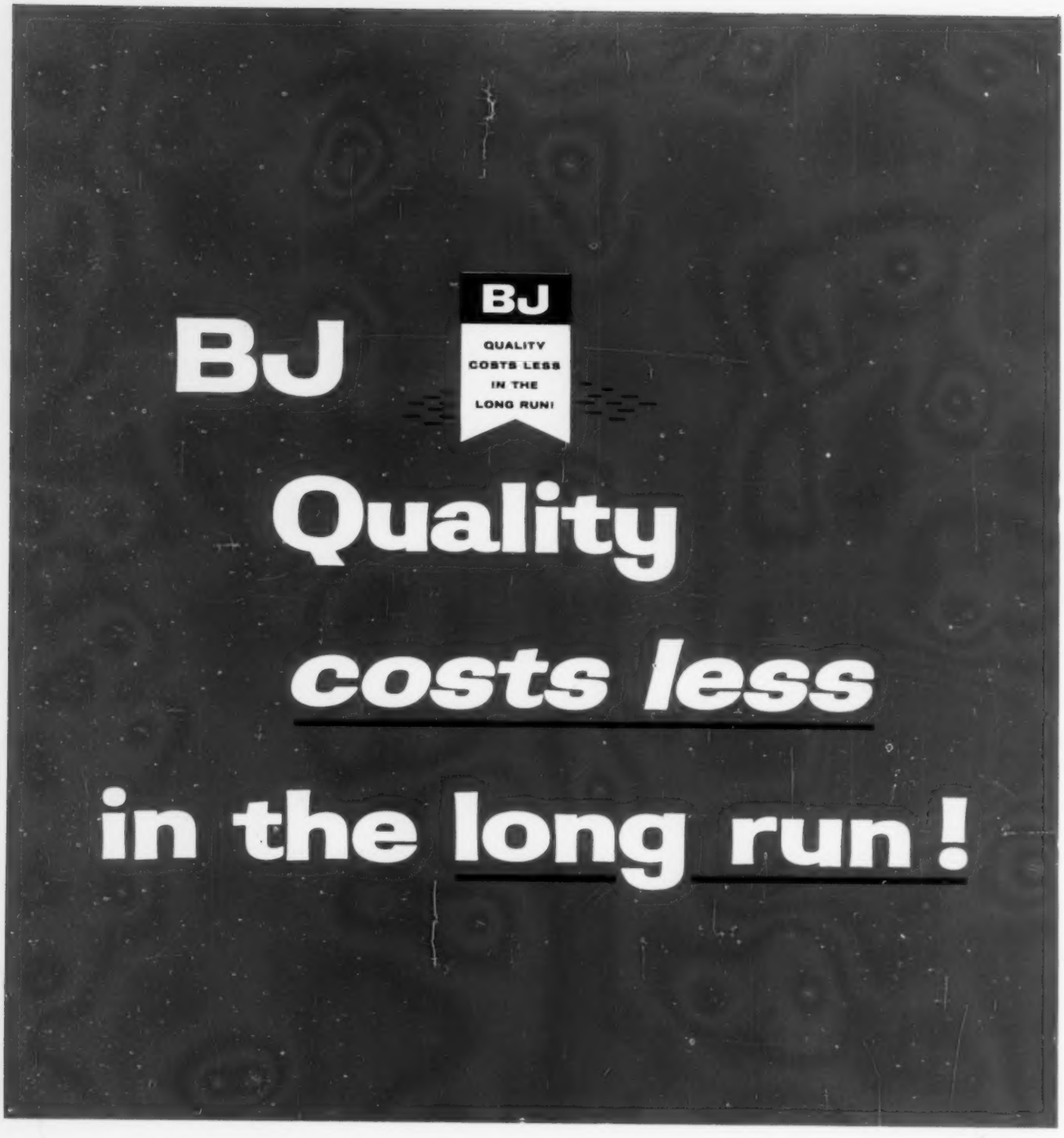
where progress is a daily practice

O·C·T

OIL CENTER TOOL CO.

SUBSIDIARY OF FOOD MACHINERY AND CHEMICAL CORPORATION

Address Export Inquiries for All Countries to
P. O. Box 3091, Houston, Texas.



"Cut-rate" merchandise is seldom a bargain. This is especially true of oil tools where a small saving in initial investment is often purchased at the price of dependability, safety and long-range economy. The true measure of a tool's value is found, not in its first cost, but in its useful working life—in its total productivity, year after year.

Byron Jackson oil tools cost a little more and are worth it.

Proof that BJ quality costs less in the long run is this: more BJ tools are seen on rigs the world over than any other make. Users know that our 88-year reputation for quality stands behind every Byron Jackson product. These products are sold through leading supply stores everywhere and are backed by our own field staff of trained personnel — paid by BJ to do right by the customer.

Byron Jackson Tools, Inc.
A SUBSIDIARY OF BORG-WARNER CORPORATION

P. O. Box 2017, Terminal Annex, Los Angeles 54, Calif. • EXPORT OFFICE: Byron Jackson Tools, Inc., 580 Fifth Ave., New York—Cable: "BJTOOL"

Facilities outside the United States include factories in Mexico City, Mexico, and Etten en Leur, The Netherlands, and sales and service offices in Argentina, Bolivia, Brazil, Japan, Peru, Trinidad, Venezuela and Thailand.

BJ
QUALITY
COSTS LESS
IN THE
LONG RUN